Protector Tests NEO Koroyd 3.0 Protector

NEO Koroyd 3.0 protector: greatest height (thickness) = 8 cm
The protector has a certification according to the European Regulation on Personal Protective Equipment "Regulation (EU) 2016/425".

Figure 1: The NEO Koroyd 3.0 Protektor (Foto: NEO)

The damping capacity of the NEO Koroyd 3.0 protector was examined. Background: After accidents, the assumption had arisen that the Koroyd protector has poor damping capacity due to its relatively hard materials. Especially in case of impact with lower sink rates than these are tested in the LTF/EN protector test. The review was conducted by the DHV's Safety and Technology Department. The DHV is the representative of the Federal Ministry of Transport and is responsible for the safety of paragliding in Germany. The inspection was carried out in this function.

The manufacturer has provided DHV with 3 of these protectors for this purpose. A harness compatible with this protector was not available. The tests were performed with the protectors directly attached to the dummy. Normally, harness and protector are tested together. It can be assumed that the damping values of the Koroyd 3.0 protector are better when it is installed in the harness, because the components of the harness usually have an additional damping effect.

Link Testvideo LTF/EN Standard-Test

Comparison values
The lower the measured G-load, the better the damping of the protector.

Without protector: In the standard EN/LTF test configuration (1.65 m drop height), acceleration forces >250 G acts on the sensor of the dummy without damping by a protector. This measures the force acting axially (from the buttocks towards the head) on the spine.

Protectors of conventional design (air protectors, foam protectors) dampen the energy during the protector test in standard EN/LTF test configuration (1.65 m drop height), to values between 20 and 40 G, depending on the design and height (between 12 cm and 30 cm).

Test configurations

The LTF/EN protector test only provides for test configuration 1. Configuration 2 is intended to show how the protector performs at lower drop heights, i.e., lower force levels. Configuration 3 shows whether and how well the protector damps in the event of an impact on the back.

1. Standard EN/LTF test (1.65 m fall height, theor. fall speed approx. 5.3 m/s, dummy in sitting position, limit values*)

NEO Koroyd 3.0 protector 46 G at a permitted limit of 50 G

2. DHV-internal test, half drop height (0.825 m drop height, theor. drop speed approx. 4 m/s, dummy in sitting position)

NEO Koroyd 3.0 protector 28 G, no limit values because not LTF/EN compliant

3**. DHV internal test, half drop height (0.825 m drop height, theor. fall speed approx. 4 m/s, dummy in 75° tilted position, impact back)

NEO Koroyd 3.0 protector 26 G, no limits because not LTF/EN compliant

*Limit values according to LTF

The following limit values must not be exceeded during protector testing:

50 g as maximum value

38 g up to an exposure time of 7 milliseconds

20 g up to an exposure time of 25 milliseconds

All three criteria must be met.

** With the DHV protector test device, tests can be performed with different positions of the dummy. From sitting upright, slightly leaned back (EN/LTF standard configuration with 22° leaned back position of the dummy), 45° leaned back position, 75° leaned back position, 90° leaned back position).

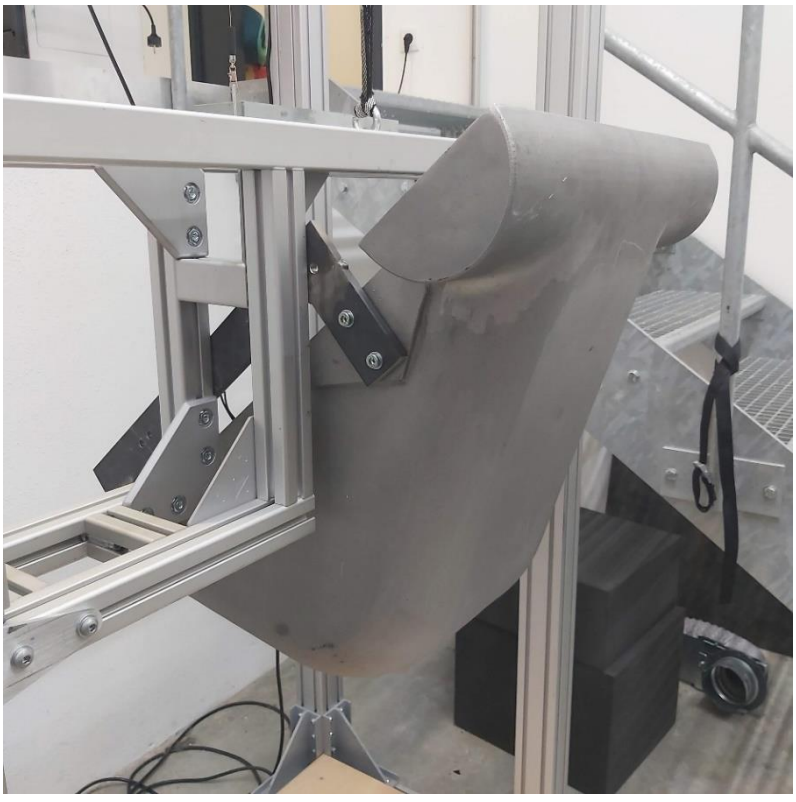

Figure 2: Dummy in seated position, slightly leaned back, according to EN/LTF (impact buttocks)

Figure 3: Dummy in 75° leaned back position, DHV-internal test (impact back)

Findings

- The overall thickness of the Neo Koroyd protector 3.0 is ½ to 1/3 of the height of conventional protectors.
- The Neo Koroyd protector 3.0 meets (without being mounted in a harness) the limits of the EN/LTF protector standard in the standard test, but just barely.
- The Koroyd damping parts are deformed/compressed so much during the test (Figure 4) that a second test with the same protector had a negative result. The LTF require two tests with the same protector, the EN only one. The LTF is currently being adapted to the EN on this point.
- Tests from half drop height (not EN/LTF compliant): The Koroyd damping parts in the seat area of the protector showed clear signs of deformation after the test. The protector obviously had a damping effect even at the considerably lower impact speed (Fig. 5 and 6).
- Tests with impact on the back (dummy position 75° leaned backwards, not EN/LTF-compliant): In this test, deformations of the Koroyd damping parts were visible in the back part of the protector (Fig. 7). In this case, too, the protector had a damping effect.
- The rebound effect (bounce) after initial impact was significantly less with the Koroyd protector than with airbag/foam/inflatable air protectors (see video link above).
- In protector research (for damping paraglider harness protectors), too little medical knowledge is known about the consequences of low or high rebound (bounce) after initial impact.

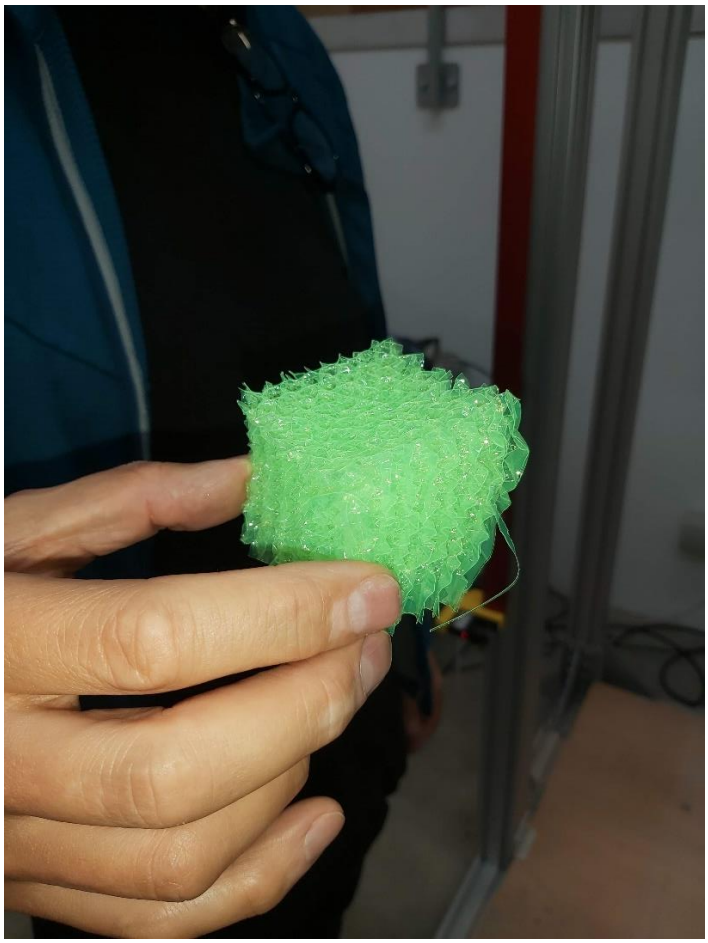

Figure 4

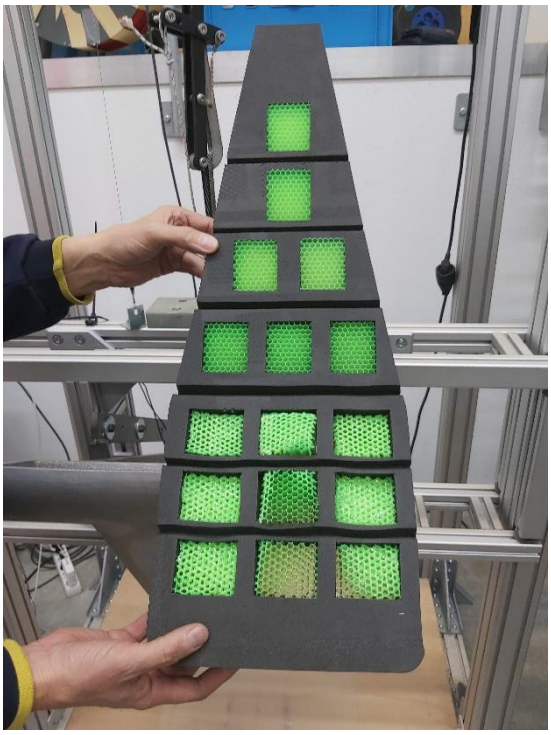

Figure 5

Figure 6

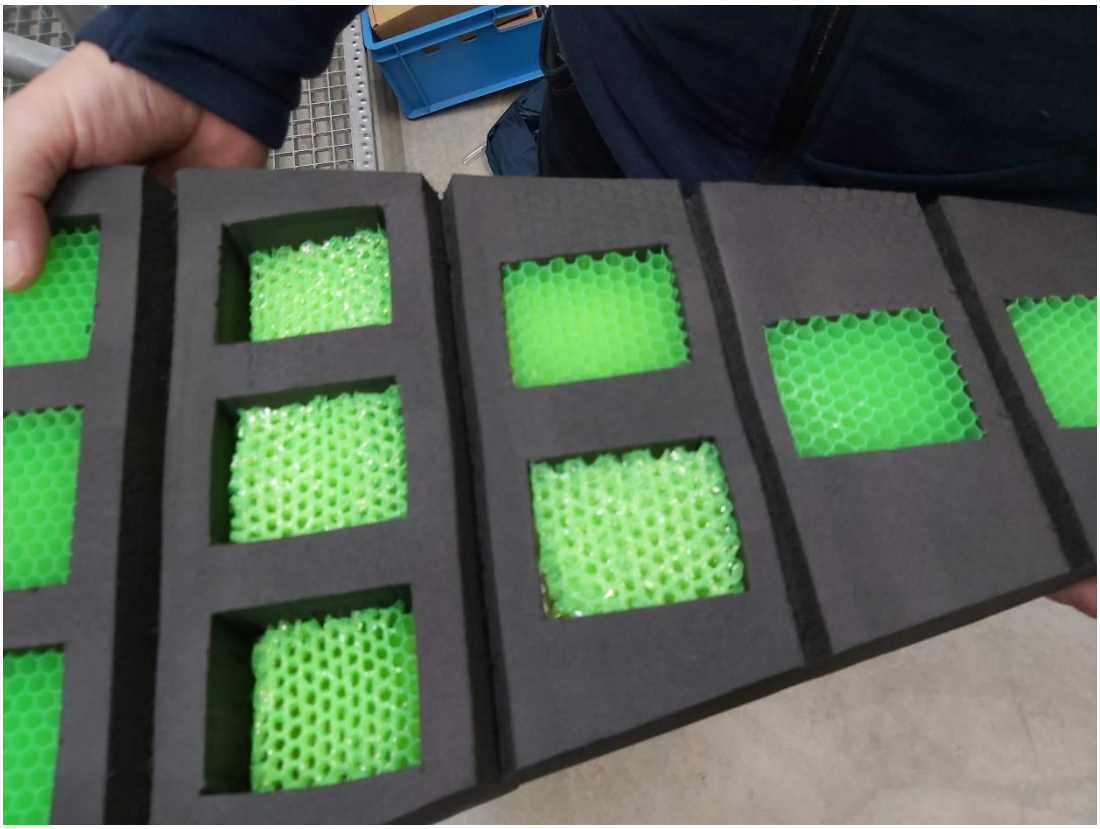

Figure 7

Test-Standards
EN 1651
LTF HG/GS

DHV Sicherheit und Technik 1/2023