

P R E S S R E L E A S E

Autoliv Launches World's First Whiplash Protection for Rear-Seat Occupants

(Stockholm, September 15, 1999) – At a press conference at the Frankfurt Auto Show, Autoliv Inc. (NYSE: ALV and SSE: ALIV) - the worldwide leader in automotive safety systems - presented the world's first anti-whiplash system specially developed for rear-seat occupants. The new Self-Inflating Head Restraint (SIHR) follows upon the introduction last year of Autoliv's anti-whiplash system for front-seat occupants AWS, which has proven to be very effective according to independent car crash tests performed, for instance, by the Insurance Institute of Highway Safety (IIHS) in the United States.

Autoliv's new system SIHR consists of a bag in the backrest which is filled with air. In a rear-end collision, the air is pressed to a small bag in the headrest, which then will be moved forward up to 5 cm. This reduces, or eliminates completely, any dangerous gap between the occupant's head and the headrest. About 90% of the occupants are sitting with a gap up to 20 cm. Typically, the gap is 10 cm, which is enough, however, to risk creating a whiplash disorder.

As in Autoliv's anti-whiplash system for front-seat occupants, the new SIHR system has the advantage of not needing a sensor to be triggered. Nor does it require a gas generator to inflate the bag in the headrest. Instead, the system works automatically. It is the occupant himself that triggers the system and inflates the headrest bag, by pushing into the foam of the seatback during the early phase of the rear-end collision. Autoliv's SIHR system is thus simple, reliable and easily resettable after being used in a rear-end impact.

Test results

In laboratory sled tests simulating a typical low speed rear-end collision (i.e. velocity change = 17 km/h, which corresponds to a crash speed of 25-30 km/h, and pulse level = 8g), Autoliv's new anti-whiplash system SIHR has shown to be very effective. Compared to a traditional, static headrest, Autoliv's SIHR system reduced the loadings to the neck by as much as up to 50%. Even more important is the fact that the SIHR values consistently have shown to be within levels that are deemed to be non-injurious. The gap between the head and the headrest was varied in the tests up to 10 cm.

As a reference, a test was also done without any headrest at all. In that test, the loading to the neck was more than four times as high as in the test with Autoliv's SIHR and, as expected, far above tolerable levels.

In order to determine the risk for side effects, another test was performed which showed that Autoliv's SIHR system did not increase the loading to the neck compared to a conventional, static head restraint, if the head originally was leaning on the headrest.

In these tests, the new Biofidelic Rear Impact Dummy, BioRID, was used. Unlike a traditional test dummy, BioRID has the same number of "vertebrae" as a human being. The BioRID test dummy has been developed by the Chalmers University of Technology in Sweden in cooperation with Autoliv, Saab and Volvo.

Evaluation of the loading to the neck was done with the Neck Injury Criterion (NIC).

The Whiplash Issue

Rear-end collisions typically account for a quarter of all traffic accidents in North America and Europe. Although these collisions rarely lead to life threatening injuries, they often give rise to whiplash injuries. Of these injuries, 10% lead to permanent disability. Neck injuries are therefore the single most important expense to insurance companies for personal injuries to car occupants. In many countries, neck injuries account for 50% of these costs. In the United States alone, the annual costs exceed \$7 billion.

In addition, the frequency of neck injuries with long-term consequences is increasing and has doubled between the 1970's and 1990's according to Swedish data

In over 90% of the rear-end collisions, the velocity change of the impacted car was below 25 km/h.

Illustrations:

An animation showing the SIHR working principle and live sequences from the tests, as well as photos of Dr. Håland, are available for downloading from Autoliv's web site <http://www.autoliv.com>, see under News and this press release.

Videotapes are also available in Beta or VHS from the Company.

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Autoliv Inc. develops and manufactures automotive safety systems for all major automotive manufacturers in the world. The company has more than 60 wholly-owned subsidiaries and joint ventures with 22,000 employees in 28 vehicle-producing countries. In addition, the company has eight technical centers around the world, including 19 test tracks, more than any other automotive safety supplier. Sales in 1998 amounted to close to US \$3.5 billion and net income US \$188 million. The company's shares are listed on the New York Stock Exchange (NYSE: ALV), its Swedish Depositary Receipts on the Stockholm Stock Exchange (SSE: ALIV) and its stock options on the Chicago Board Options Exchange (CBOE: ALV.)

