The EU-funded ADSEAT project has developed the world’s first virtual crash test dummy of an average female. The computational model is to be used in virtual testing of vehicle seat safety performance.

So-called ‘whiplash’ injuries, most often caused when a person is sitting in a car struck from the rear, can lead to severe pain and suffering for the victim and may result in huge societal costs. Crash statistics have long shown that females are at higher risk of sustaining whiplash injuries, by a ratio of 1.2 to 3.1 times when compared to males. One of the reasons is that, until now, the only available model for assessing seat designs aimed at protecting against whiplash has been that of an average male.

“In order to improve safety, we need models of the human body to be used in crash tests,” explains Astrid Linder, Research Director for Traffic Safety at the Swedish National Road and Transport Research Institute. But men and women are different. “In the area of crash testing, no model of the average female has ever been available. “Therefore,” says Linder, “we decided to develop such a model in order to have the tool necessary to improve safety for both males and females.”

Linder leads the ADSEAT project, an EU-funded research initiative aimed at developing a computational dummy model of an average female. The model, called EvaRID (Eva female, RID – Rear Impact Dummy), incorporates information on the anthropometry of the average female, based on data found in the scientific published literature. In addition, new data from tests using male and female volunteers in identical conditions were also collected and analysed.

Linder says, “No one in the crash testing area has either outlined the specifications for the average female or implemented these in a virtual crash test dummy. We have done both.”

A prototype dummy model, called BioRID 50F, was also constructed. Sled testing with this device allowed direct comparison to the dynamic performance of the existing male-based BioRID II dummy.
Tests were conducted in line with the European New Car Assessment Programme (Euro NCAP) test procedure. According to ADSEAT reports, the results confirmed that real differences are to be expected when a seat is loaded with a dummy representing a female instead of a male. Project partners say this work has received considerable positive attention, particularly among car manufacturers.

**Successful team effort**

The ADSEAT consortium consisted of 12 partners from several European countries. Linder says, “International and European co-operation is essential on topics as large as crash test dummies. Today, no partner on its own could carry out a project like ADSEAT. We have participants from the whole world in the Advisory Group, and we have representatives from most of the European experts in the field.”

Furthermore, she adds, “Without the support of the EU, there would still not be a virtual crash test dummy of an average female anywhere in the world.”

**Supporting wider policy goals**

The ADSEAT project represented an important contribution to improving the safety performance of road vehicles, a key priority for the European Commission. EU Project Officer Ludger Rogge says, “The ADSEAT project shows good results to reduce painful whiplash injuries,” and this important step forward will also ultimately be reflected in reduced medical and insurance costs.

Based on the results of its work, ADSEAT is now in a position to provide guidance on the larger question of how to evaluate the protective performance of vehicle seat designs, all aimed at reducing the incidence of whiplash associated disorders for both men and women.

Asked who will ultimately benefit, Linder responds, “In particular, half the population – females will benefit from the outcome of this project. But improved knowledge about how to prevent whiplash injuries will also be beneficial for the male part of the population.”

The likely benefit in financial terms is still being quantified, but there can be little doubt that, “In addition to the reduction of the pain and suffering for the injured person, fewer injuries mean a lower financial burden on society.”

**Latest on the project**

ADSEAT’s EvaRID, a virtual crash test dummy representing an average woman, is currently available on the market through Humanetics [3]. The ADSEAT partner, the world’s largest supplier of crash test dummies, sells EvaRID through a commercial software licence.

Meanwhile, other ADSEAT partners are continuing the research, says project coordinator Astrid Linder of the Swedish National Road and Transport Research Institute, VTI. One such project involves the institute, Volvo, Chalmers and Folksam. They are carrying out additional research on whiplash injuries.

The project, funded by Sweden’s innovation agency, aims to improve the methodology for safety tests involving both male and female models. It is also developing an open source human body model of an average female. This type of licence would allow researchers from around the world to contribute to the model and adjust it to meet their needs.

“The overall goal is to promote innovative safety developments and ensure that future safety systems
“protect everyone,” says Linder. “Additional research would encourage the development of a physical test dummy that represents the average woman.”

**See also:**
CORDIS [4]

**Project:**
Adaptive seat to reduce neck injuries for female and male occupants

**Project Acronym:**
ADSEAT

**Project website:**

**Contact:**
Contact [5]

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**Links**
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