

Consumer Testing of Bicycle Helmets

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Conclusion:

All helmets need to reduce rotational acceleration more effectively. A helmet that meets the current standards does not necessarily prevent concussion.

Consumer tests play an important role in informing and guiding consumers in their choosing process. Consumer testing could also encourage helmet manufacturers to up their game and bring to market new helmet models that perform at least as well as the best existing models.

Introduction

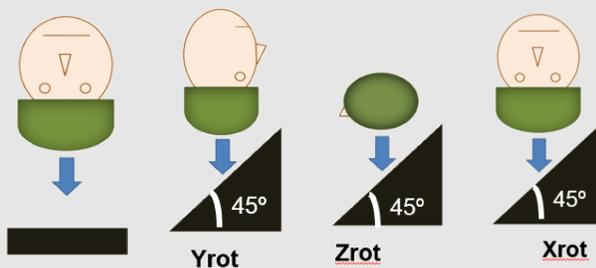
Current bicycle helmet standards do not include angular acceleration, for certification even though it is known that it is the dominant cause of brain injury.

Aim

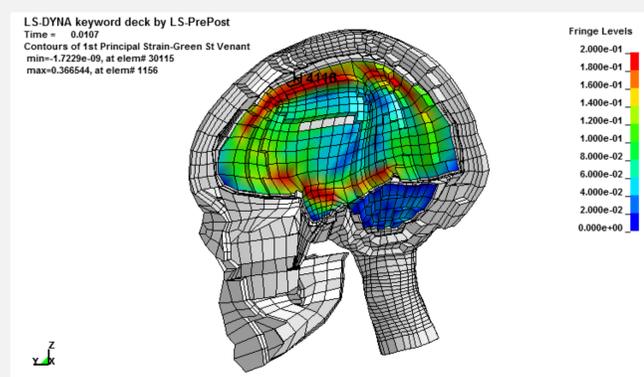
To develop an improved test method, including oblique impacts, to evaluate helmets sold on the European market.

Methods

Four physical tests were conducted, shock absorption with straight perpendicular impact and three oblique impact tests. Computer simulations were made to evaluate injury risk. In total, 26 conventional helmets and one airbag head protector sold on the European market were included.



Two shock Absorption Test (5.6 m/s, ISO headform) and three oblique impacts (Angle 45°, 6.0 m/s, Hybrid III headform)



Computer Simulations Used to Evaluate Injury Risk

Results

In 13 helmets a linear acceleration lower than 180 g were measured, which corresponds to a low risk of skull fracture. The airbag head protector performed three times better than the conventional helmets. The simulations indicated that the strain in the grey matter of the brain during oblique impacts varied between helmets from 12% to 32%, where 26% corresponds to 50% risk for a concussion. Helmets equipped with systems aiming to reduce energy performed better than the others. But the fact that a helmet is fitted with rotational protection is no guarantee that it is a safe helmet.

This is why Folksam test bicycle helmets

Every day three cyclists in Sweden sustain head injuries, which are some of the most severe injuries a cyclist can experience. Data from real-life crashes show that bicycle helmets are very effective to reduce injuries. Two out of three head injuries from bicycle accidents could have been avoided if the cyclist had worn a helmet.



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