

Public consultations  
**European Road Safety Action Programme 2011-2020**  
**Consultation period: 25/09/2009 - 20/11/2009**

**Comments from Honda Motor Europe Ltd.**

Honda welcomes the European Commission public consultation on the European Road Safety Action Programme 2011-2020.

Honda, as a global company, with local presence in all major regions, is the worlds' largest internal combustion engine manufacturer, serving the needs of approximately 20 million customers annually. The company perceives itself as a mobility provider, as it offers a wide range of cars, motorcycles, all terrain vehicles, outboard marine engines, and various power products to a diverse customer base across the globe.

For motorcycles in particular, Honda is the global market leader, meeting the needs of around 10 million people annually. In Europe, Honda is also the market leader, offering a range of utility scooters, touring motorcycles, off-road motorcycles, and sports motorcycles. Southern European countries tend to especially appreciate powered two wheelers as mobility products, which allow riders easy and efficient mobility in congested urban areas, whilst Northern European countries mostly see the motorcycle as a leisure product.

Honda considers road safety as one of our top priorities. For Honda, effective road safety must be approached by all road using stakeholders, including among others, car drivers, motorcycle riders, pedestrians, cyclists and infrastructure authorities. However, it is our motorcycle market leadership and our strong commitment to motorcycle safety that are the driving forces behind this particular contribution.

Honda, being an active member of ACEM - the Motorcycle Industry in Europe - fully supports the submission already made by ACEM to this Public Consultation. Nevertheless, we believe that we can add value to this Public Consultation by providing an additional **specific manufacturer's opinion on an issue that is currently attracting a lot of attention, namely motorcycle braking**.

## **Advanced Braking Systems**

With regard to active safety (accident avoidance) for motorcycles, braking is unmistakably the most important vehicle-related factor.

Honda is an active supporter of ACEM's voluntary braking commitment that aims at offering an advanced braking system on the majority of newly sold street models on the European market by 2010. Moreover, Honda committed in 2004, by signing the European Road Safety Charter, to achieve this goal by 2007 for Honda models. To date, we are pleased to say that 75% of our extensive model line-up (ranging from a 50cc moped to a 1800cc Goldwing) is available with an advanced braking system, at least as an option. In the market, this translates in an encouraging take-up by customers in the same order of magnitude (>66%).

Advanced braking systems include a range of systems. In Honda's model line-up, there are three primary types of motorcycle advanced braking systems, namely ABS, CBS and a combination of the two.

While we are confident that most people have a good idea of what an anti-lock braking system does<sup>1</sup>, we would like to use the opportunity of this Public Consultation to highlight a less known, yet very effective motorcycle braking system: CBS.

A combined braking system (CBS) applies braking pressure to both the front and rear brakes when either the front brake lever or rear brake pedal is activated. CBS can help slow the vehicle if the rider only applies one of the two brake inputs. There are three main types of CBS:

- Rear CBS - Applies the rear and a portion of the front brakes when the rear brake lever (scooter) or pedal (motorcycle) is applied. The front brake lever applies only the front brake. This type of system is generally found on small displacement scooters/motorcycles, but has been applied to larger models in some instances.
- Front CBS - Applies the front and a portion of the rear when the front brake lever is applied. The rear brake pedal applies only the rear brake. A PCV (Proportional Control Valve) may be utilized to minimize or prevent rear wheel lock under heavy front lever application. This type of system is less common and has been applied only to certain medium to large motorcycles.
- Dual CBS - This type of system employs both types 1 and 2 and is generally found on medium to large motorcycles.

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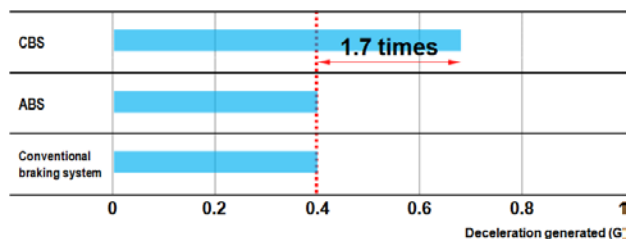
<sup>1</sup> ABS helps to prevent the wheels from locking during braking by automatically releasing brake pressure prior to wheel lock-up. The system senses when a wheel first begins to lockup and automatically releases pressure to allow the wheel to begin to roll again. ABS can help prevent skidding and loss of directional control, especially on slippery surfaces.

When compared to automobiles, the centre of gravity of motorcycles is higher and their wheelbase is shorter, making the shift in the centre of gravity for motorcycles during braking greater than that of automobiles.



That is why the braking characteristics of motorcycles' front and rear wheels largely differ from each other: the front wheel brake causes a shift in the centre of gravity to the front wheel: a high deceleration can be obtained but the nosedive is large; the rear wheel brake, on the other hand, cannot yield decelerations larger than the front wheel, but the resulting nosedive is small. Furthermore, road surface conditions vary greatly by the type of pavement and the weather conditions, affecting the rider's ability to properly operate the brakes of the front wheel and the rear wheel.

**CBS enables at any time and for anybody a proper distribution of the braking forces between the front and rear wheels in accordance with varying road surface conditions and as such assists the rider continuously during his every day braking maneuvers.**



The figure on the left shows a comparison of maximum deceleration generated by operation of the pedal only between a conventional brake system, ABS and CBS. The deceleration generated by the pedal operation in the conventional brake system is approximately 0.4G. The deceleration is increased by about 1.7 times by braking of the front wheel through the CBS, based on Honda's data.

**CBS ensures a higher degree of deceleration through the operation of one single control (lever or pedal).**

The advanced braking systems listed above offer a variety of combinations, each taking the distinctive characteristics of a motorcycle model into account. Demand and market acceptance are central to the development of advanced braking systems on motorcycles, and largely depend on the appropriateness of the solutions offered, technically and in terms of cost, to the specific motorcycle market segment and model. The continuous expansion of the even bigger variety of advanced braking systems available on the market can make a positive contribution to road safety.

## More on Honda's approach to motorcycle safety

Honda, as a pioneer in the field of motorcycle safety, is obviously active in many more motorcycle safety disciplines. In fact, we can offer a comprehensive overall safety concept, comprised of activities and technologies in the fields of preventive safety, active safety and passive safety. What follows is a brief introduction to Honda's motorcycle safety concept.

<b>Preventive Safety</b> <i>Training</i>	<b>Active Safety</b> <i>Accident avoidance</i>	<b>Passive Safety</b> <i>Reduction of accident consequences</i>
<p><b>Traffic education</b></p> <div>  <p>Riding Simulator    Riding Trainer    Bicycle trainer</p> </div> <div>  <p>Fun &amp; Safety Training    Research on ASV 3 vehicle communication systems</p> </div> <p><b>Training of riding and risk prediction skills:</b>  Honda has trained more than 40.000 people in Germany</p> <p><b>Next activities:</b>  Further expansion of Riding Trainer in Europe and worldwide, Research on Bicycle Trainer, Development of ASV 3 Technology</p>	<p><b>Advanced braking systems</b></p> <div>  <div> <div> <b>CBS</b>  Optimum brake balance </div> <div> <b>+</b> </div> <div> <b>ABS</b>  Prevention of wheel lock </div> </div> <div> <b>Combined ABS</b>  Optimum of modern braking technology </div> </div> <p><i>In Europe more than 750.000 powered two-wheelers with advanced braking system have been sold by Honda</i></p> <p><b>Next activities:</b>  By the end of 2010 Honda will equip all new models over 250cc with Combined ABS systems</p>	<p><b>Collision safety</b></p> <div>  <p>Airbag Gold Wing</p> <p><i>The world's first motorcycle airbag is available for the Honda Gold Wing</i></p>  <p>ADAC crash test with Honda Gold Wing</p> <p><i>World premiere for an airbag-equipped motorcycle at ADAC crash test facility</i></p> <p><i>Airbag efficiency is demonstrated by ADAC in a 72km/h side impact crash test</i></p> </div> <p><b>ADAC Crashtest result:</b>  „The airbag developed by Honda is a milestone in motorcycle safety.“</p>

## 1. Preventive safety - traffic education

Accident data from Japan, the US and Europe all indicate that **the majority of accidents involving motorcycles are caused by a human error**. Therefore, there is significant scope for safety improvements obtained through rider and driver education and training.

As has been described in more detail in the Honda submission to the European Public Consultation on Driver Training and Traffic Safety Education in July 2009, there is a range of safety training activities and technologies that Honda has developed and is steadily implementing across the world and in Europe.

Just recently (September 2009), Honda has opened the new Honda Safety Institute in the vicinity of Barcelona; a 25.000 square metre motorcycle training facility with a capacity to train 15.000 riders per year.



As a technology-driven company, as well as advanced safety technologies for Honda vehicles, our engineers have also developed various simulation tools which allow to train basic motorcycle control skills, but in particular hazard awareness and perception.

The Honda Riding Trainer simulation tool was released in 2005 and has found more than 1100 customers to date in Europe, thus achieving our second voluntary commitment under the European Road Safety Charter.

Hazard awareness and perception skills are paramount for the motorcycle rider in order to recognise potentially dangerous traffic situations and to react in an appropriate manner. The Honda Riding Trainer allows riders to be trained in a safe way, without exposing them to real hazardous situations.

A recently finalised research project done by the University of Padua (Italy) concluded that the Honda Riding Trainer actually enhances hazard perception skills and that rider reaction times improve.

The further inclusion of e-Coaching tools that allow hazard perception and awareness to be efficiently trained and acquired - such as is the case for the Riding Trainer - into motorcycle training curricula may result in a significant step forward in motorcycle safety for years to come.

## **2. Active safety - accident avoidance**

A key technology in the second pillar of Honda's motorcycle safety concept has been described in-depth in the previous pages of this document.

## **3. Passive safety - to mitigate injuries in the event of an accident**

Accident data from Japan, the US and Europe all indicate that frontal collisions account for over half of all collisions involving motorcycles. It has also been confirmed that many injuries result from the rider's impact with vehicles or the road surface. In view of these facts, Honda engineers sought to reduce the incidence and severity of injuries by absorbing the energy of an impact and reducing the rider's forward velocity.



To achieve this objective, Honda decided to develop a motorcycle airbag. In the event of a frontal collision, the airbag is designed to inflate and absorb some of the rider's kinetic energy. As a result, the force of impact between the rider and the vehicle or the road may be reduced, mitigating injuries.

The airbag system is currently available on the Gold Wing motorcycle.

## **A preview of the future: The motorcycle and V2V communication**

For over a decade, Honda has been researching vehicle-to-vehicle (V2V) and vehicle-to-infrastructure (V2I) communication systems for enhanced safety, efficiency and comfort.

In Europe, Honda has joined the CAR2CAR Communication Consortium in 2005; a non-profit organization initiated by European vehicle manufacturers, and open for suppliers, research organizations and other partners, with the aim to develop common interoperable standards for all vehicles, including motorcycles, and ultimately to introduce an interoperable CAR 2 CAR system into the European vehicle market. Honda's contribution to the Consortium centres around integrating the motorcycle within the CAR 2 CAR system.

This preventive safety technology is particularly promising for motorcycles - being Vulnerable Road Users - as this allows other road vehicles to be aware of the presence of the motorcycle and to generate warnings in case of a critical situation. The 'conspicuity' of the motorcycle is herewith enhanced.



### **More on Honda's approach to safety: Safety for Everyone**

With respect for the individual being an essential part of the Honda philosophy, Honda seeks to enhance safety for motorcycle riders, automobile drivers and occupants and pedestrians.

In addition to our efforts in the area of motorcycle safety, Honda is also committed to improving and adopting a wide range of safety technologies in our automobile business. These include accident avoidance technologies, technologies that minimize the impact on passengers and pedestrians in the event of an accident, and technologies that mitigate the impact of a collision on other vehicles. Testimony to Honda's achievements is the fact that all mainstream Honda models have been awarded the top 5 star rating in the Euro NCAP programme. This requires first class safety performance in all 4 Euro NCAP assessment areas (adult, child and pedestrian protection assessment plus availability of safety assistance devices such as VSA/ESC).

To further enhance the safety performance of cars, Honda has developed a series of Advanced Driving Assist Systems:

- Lane Keeping Assist (LKAS) (an EU-first on the Honda Accord in 2002)  
Lane Keeping Assist System (LKAS) uses a camera to detect the car deviating from a traffic lane and provides steering torque when necessary, thereby reducing the burden of motorway driving while at the same time enhancing safety.
- Adaptive Cruise Control (ACC)  
Adaptive Cruise Control (ACC) uses millimetre-wave radar to maintain a consistent distance to a vehicle directly in front, for more relaxed, less tiring driving.
- Collision Mitigation Brake System (CMBS) (a world-first on the Honda Legend in 2003)  
Collision Mitigation Brake System (CMBS) monitors the following distance and closing rate to the car directly in front, warning the driver when a collision is likely and helping reduce impact when a collision becomes unavoidable.  
Intelligent Night Vision System (a world-first on the Honda Legend in 2004 -for Japan market only)

For more information on the company and its safety initiatives, please visit:  
<http://world.honda.com/safety/>