



Keeping motorcyclists safe

New guidelines and high strength steels are reducing injuries to motorcyclists on the road, but more needs to be done.

In November 2012, the Federation of European Motorcyclists' Associations (FEMA) published a new booklet which calls for the introduction of a motorcycle-friendly standard for roadside safety barriers. Their goal is to reduce injuries to riders and passengers by replacing existing restraint systems which are unsafe for motorcyclists with new types of barriers which deform on impact. Thanks to our long experience with road restraint systems ArcelorMittal has actively contributed to the preparation of the FEMA guidelines and in demonstrating the performance of the high strength steels which will be used in the new safety barrier systems.

Motorcyclists are more likely to be involved in a collision with a safety barrier on bends and curves, where acceleration and deceleration occur and stability may be compromised. Riders typically slide into the barrier and may impact it with any part of their body.

Deformation critical to rider safety

To minimise injury, the barrier must decelerate the motorcyclist and/or deform on impact to absorb energy. While continuous motorcyclist protection systems offer the most effective means to decelerate a sliding rider, material selection is a critical factor.

In terms of deformation, some materials are particularly inefficient. The FEMA report notes that concrete is of concern as it: "...will not appropriately absorb the

motorcyclist's impact energy, especially in situations where a high-angle impact is likely such as in bends."

During 2007 the Asociación Mutua Motera (Spanish FEMA member), undertook a full-scale crash test using a 'New Jersey' concrete barrier profile which is generally

considered motorcyclist-friendly. The results showed that head injury risks were 1.5 times higher than the limit imposed by TS 1317-8 (see box).

Long-term steel safety barriers

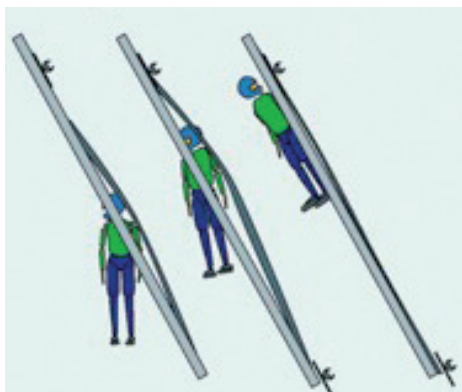
By comparison, properly designed high strength steel (HSS) barriers are flexible enough to absorb the momentum of the rider and their motorcycle, yet robust enough to safely contain and redirect the rider. HSS can also be used in barriers designed to contain larger road vehicles such as cars and trucks. Even after an accident, damage to steel barriers is limited and immediately visible. Sections can quickly be replaced where necessary. This is usually not possible with barriers made

Figure 1: Example of a two-part steel safety barrier with traditional top rail and additional sub-rail to protect motorcyclists

(pictures courtesy of Volkmann & Rossbach and PassCo)



Figure 2: Sample test protocol from TS 1317-8 using a dummy against a motorcycle protection system (MPS)



Calls for Europe-wide standard

At the moment there is no Europe-wide standard for motorcycle-friendly safety barriers. Instead, different test protocols are used and many countries have introduced their own strategies.

To provide a regional blueprint, the European Committee for Standardisation (CEN) has developed the TS 1317-8 test standard. It contains provisions for the testing of safety barriers under the impact of a rider sliding along the ground. TS 1317-8 is designed to be used together with the existing EN 1317 standard for safety barriers. The TS is the first step toward European harmonisation of barrier standards and has already been implemented in some countries.

The European Parliament remains committed to introducing a single standard across the EU. It has called on Member States to refit dangerous

stretches of road with motorcyclist-friendly guardrails to protect these vulnerable road users.

Some motorcycling organisations have called for barriers to be removed entirely to improve safety. However, FEMA notes that removing the barriers would not solve the problem as other obstacles such as trees or lighting poles remain and it would compromise the safety of other road users.

FEMA's new booklet: *New Standards for Road Restraint Systems for Motorcyclists*, is an important tool in this campaign. The document provides "accurate and complete information on the solutions available to road authorities and infrastructure operators who wish to upgrade road restraint systems." More information, including examples of suitable safety barriers, can be found at www.mc-roadsidebarriers.eu.

from other materials where damage may not be detectable at a first sight and repairs can be expensive and time-consuming.

One of the simplest and most effective motorcycle protection designs that FEMA has identified is a two-part steel barrier (see Figure 1). The system offers a normal guardrail at the top, with the addition of a long and continuous protective sub-rail underneath.

The sub-rail stops the rider sliding under the barrier and into roadside obstacles such as trees or lighting poles. As it is long and flat, the sub-rail is also effective at

decelerating the motorcyclist and prevents them hitting the posts which keep the barrier in place.

Safety barriers made of HSS usually have a simple flat profile which helps to reduce injuries. By comparison, structural steel profiles require several bends to make them rigid. This leaves sharp edges which can come into contact with a rider in an accident.

Cost-efficient solutions

HSS safety barriers are more cost-effective than other materials. Their flat profile limits

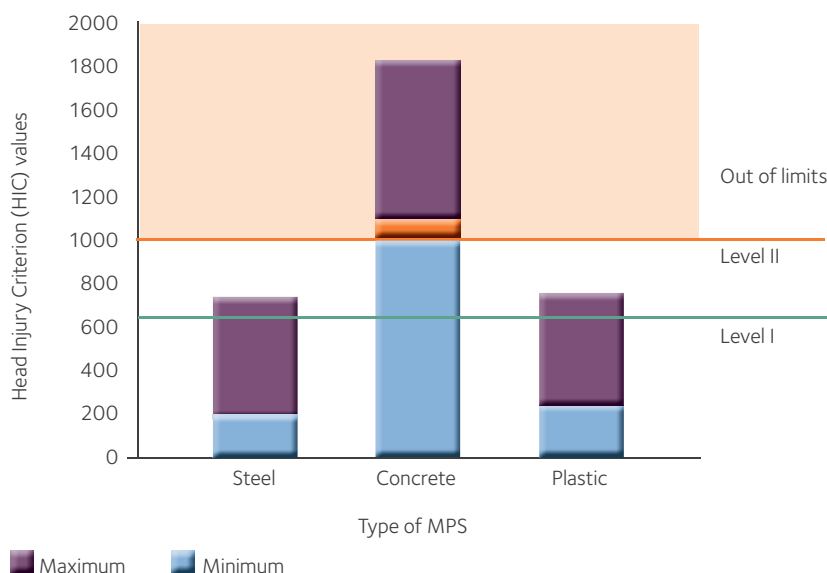
manufacturing operations, minimising production costs. Used in thicknesses below 1.5 mm, HSS guardrails require much less steel than structural steels which must be at least 1.8 mm thick. The environmental performance of the HSS is also superior as it is lighter – reducing emissions during production and transportation of the finished guardrails to the installation site.

When used with ArcelorMittal's self-healing coating Magnelis®, HSS barriers offer long-term, cost effective safety for up to 20 years – even in maritime environments.

While much work needs to be done before TS 1317-8 is adopted as a European standard, safety barrier manufacturers are already using ArcelorMittal's expertise to produce HSS solutions which provide optimum protection for motorcyclists. Together with FEMA, ArcelorMittal intends to continue our efforts to improve safety for all road users.

Figure 3: Performance of different types of MPS of around 25 products tested

(Source: FEMA)



More information?

- www.arcelormittal.com/industry/safetybarriers
- www.fema-online.eu