

# Concrete safety barriers : a lifetime of safety

Concrete safety barriers offer a sustainable solution for road safety. They are available in a wide range of products, from temporary workforce protection in a work zone, to the highest containment levels for heavy goods vehicles. They are competitive with other barrier systems based on initial construction costs and, thanks to their 50-year life, concrete barriers are unbeatable on life-cycle cost.



## ■ Concrete safety barriers - a safe and versatile solution

Concrete is one of the most versatile and durable construction materials known to man, making it the most widely used construction material in the world. This versatility is reflected in the wide range of applications of concrete vehicle restraint systems.

### **Safety**

In the first place, concrete safety barriers' role is to offer the highest level of safety.

Live crash tests show that concrete barriers are safe for passenger cars and their occupants, and that they are the best performing solution to contain heavy goods vehicles.

Thanks to their smooth continuous surface, concrete barriers do not need additional (retro-fitted) motorcyclist protection devices, unlike wire-rope barriers or conventional steel barriers.

Concrete safety barriers are fully compliant with the relevant European standards of series EN 1317.



Photo: Deltabloc International

### **Precast & in-situ cast**

The combination of in-situ cast concrete barriers with precast products makes them the most complete solution. For example, a median reserve protected by an in-situ-cast barrier can be combined with precast elements at the site of an emergency crossing point.



Photo: Deltabloc International



Photo: Omnibeton



Photo: Omnibeton

### **Range of products**

Both precast and in-situ-cast barriers are available in different heights and widths. With the in-situ-cast solution a variable height is even possible on both sides of the barrier.

Concrete barriers can be mounted on any road surface, paved or unpaved.

Several products exist for permanent and temporary (work zone protection) installation.

If necessary, an integrated solution of road restraint system and noise-reduction products is possible, CE-marked for safety, durability and acoustic performance.



Photo: Omnibeton



Photo: Deltabloc International

### ■ High performance for a 50-year lifetime – minimising disruption to traffic

Thanks to their rigidity, concrete safety barriers show little or no deflection when hit by a car or a heavy goods vehicle. Most crashes with passenger cars do not even damage a concrete barrier, making it an extremely robust road restraint system.

This also means that repairs are seldom necessary. In the event of a central reserve crash when the central barrier is impacted, traffic continues to flow. For steel barriers, a temporary closure of a road lane is needed for repair, putting maintenance personnel's lives at risk and causing disruption to traffic flow.

In addition, most concrete safety barriers are maintenance free and are all-weather resistant.

Thanks to an adequate corrosion protection (epoxy, galvanisation etc.) of the steel reinforcement, the durability over a 50-year lifetime is guaranteed.

### ■ Lowest life-cycle cost gives concrete the clear advantage

Concrete safety barriers have a lower life-cycle cost than any other type of road restraint system. This is confirmed by several independent studies.

"In the U.K. the Transport Research Laboratories did a substantial study comparing steel guardrails and rigid concrete barriers, whereas concrete showed the lowest

life cycle cost."<sup>1</sup>

A Swedish study concluded: "The calculation results show that concrete barriers generate the lowest life-cycle cost compared to cable and w-beam barriers. This result is mainly due to the fact that concrete barriers generate the lowest maintenance and socio-economic costs among the barrier types studied. The underlying factor for this is that concrete barriers require limited maintenance, which in turn results in limited traffic disturbances and, consequently, lower socio-economic costs."<sup>2</sup>



Photo: Gomaco

<sup>1</sup> Whole Life Cost Analysis of Median Safety Fences, G.L.Williams, TRL

<sup>2</sup> Road Design for Future Maintenance – Life Cycle Cost Analysis for Road Barriers, H.Karim, KTH

## ■ Ongoing developments mean a promising future for rigid vehicle restraint systems

### ***New concepts***

Innovation in the sector of precast and in-situ-cast barriers continues. Over the last few years, this has already led to significant improvements and a widened range of applications:

- Corrosion-resistant rebar;
- Tested transitions between concrete and steel and between different types of concrete systems;
- Systems suited for use on bridges, thanks to minimal load transfer between the barrier and the bridge deck;
- Specific repair systems for in-situ-cast barriers;
- Barrier overlay systems whereby existing concrete barriers are strengthened by placing a mesh over the existing profile and by slipforming over the mesh, creating a new, higher and wider barrier.

### ***Better machines***

Modern 3D-guided slipform pavers allow for higher accuracy in the finishing of in-situ-cast concrete safety barriers. Safety on the jobsite is increased and failure risk is minimised.



Photo: Deltabloc International



Photo: Deltabloc International

# WITH A 50-YEAR DESIGN LIFE, CONCRETE OUTLASTS ALL OTHER COMPETING SYSTEMS.



Photo: FEBELCEM

**The range of modern concrete safety barriers, both precast and in-situ cast, offer the complete solution for road restraint systems. They dramatically reduce the financial and social costs of barrier repairs, helping reduce accidents to the workforce, and keeping traffic flowing. Cross-over accidents, where vehicles crash through the barrier, are virtually eliminated. Modern designs mean traffic impacting the barrier is re-directed in the direction of the traffic flow, protecting passengers from serious accident injuries.**