

## Concrete Step Barrier Design Guidance Sustainable Construction

DRAWINGS



CSB on M1 Motorway

### Introduction

Construction products need to be fit for purpose and provide value for money. However, they should also be selected to be sympathetic in terms of social and environmental impacts. Britpave's Concrete Step Barrier is the winner of The Concrete Centre's Sustainability Award, 2005.

### Sustainable construction

The Department for Trade and Industry sets down key sustainability actions<sup>1</sup> for the construction industry in terms of environmental responsibility, social awareness and economic profitability. These are:

- design for minimum waste;
- use lean construction techniques and minimise waste;
- minimise energy in construction and use;
- do not pollute;
- respect people and local environment;
- preserve and enhance biodiversity;
- conserve water resources;
- monitor and report using benchmarks.

### CSB & Sustainability

Concrete Step Barrier (CSB) is a minimal maintenance safety barrier system offering high containment and, critically, the barrier system remains serviceable even following impact. The risks to road users and maintenance workers will therefore be greatly reduced by wider installation of CSB on the road network. Less maintenance work leads to reduced congestion on roads improving journey reliability.

CSB offers a long serviceable life, uses recyclable materials, and employs lean construction techniques, using slipform processes and continuous steel strand to minimise waste. With no requirement for routine maintenance, CSB leads to a reduction in vehicle emissions associated with traffic congestion and maintenance vehicles.

In summary, Concrete Step Barrier is a sustainable solution that encompasses social, environmental and economic benefits.

<sup>1</sup> Department for Trade and Industry Sustainable Construction Brief  
2. April 2004.- [www.dti.gov.uk](http://www.dti.gov.uk)

## Benefits of Concrete Step Barrier

High containment Concrete Step Barrier improves road safety and reduces incident related congestion. CSB requires no replacement or repair after collision from a vehicle under 13t and has the following benefits:

- Higher containment reduces risk of crossover;
- Serviceable life of at least 50 years;
- Cost-effective solution with low whole life costs;
- Reduced traffic congestion - fewer lane closures (Figure 1);
- Improved worker safety - less time spent in central reserve;
- Space saving - operates with minimal working width;
- Fully recyclable and can use recycled aggregates in its concrete.

## Comparison to other barrier systems

### a) Concrete systems

Until 2005, the concrete safety barrier commonly used on British roads was Vertical Concrete Barrier (VCB). CSB has certain advantages over VCB:

- In tests, CSB contained a 13t coach<sup>2</sup>, compared to a 1.5t car for VCB;
- CSB profile is designed to safely redirect an errant vehicle along the line of the barrier; resulting in an impact severity rating level B; VCB only achieves level C<sup>3</sup>;
- CSB is easier to slipform.



Figure 1  
Steel barrier replacement works – lane closures and traffic management

### b) Steel systems

Concrete Step Barrier has significant advantages over deformable steel barrier systems:

- CSB remains serviceable following the crash test impact. Deformable steel barriers require replacement even after minor impact (Figure 2);
- CSB has a serviceable life in excess of 50 years, compared to 20 years for typical steel barrier systems;
- CSB is a simple system with minimal components and no requirement for a stock of spare parts;
- CSB does not require regular maintenance;
- CSB causes no pollution of water courses as can be caused by products from degrading steel systems.



Figure 2  
Repairs to steel barrier following minor impact

<sup>2</sup> See data sheet DS/CSB/516

<sup>3</sup> See data sheet DS/CSB/521