

# EUROTEST 2006

## MOTORWAY ROADWORKS

The Quality of Motorway Roadwork Sites in  
Europe

[www.AAtrust.com](http://www.AAtrust.com)

EuroTest 2006 is a consortium of motoring organisations in Europe:  
The AA Motoring Trust (UK), ACI (Italy), ACP (Portugal), ADAC  
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NAF (Norway)

**THE AA MOTORING TRUST  
EUROTEST 2006  
MOTORWAY ROADWORKS**

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# 53 Road Work Zones Tested



## **2 Foreword: UK sets the standards for Europe**

### **Background**

Motorways are the arteries of the UK economy. As the economy grows, so does motorway traffic, up by 37 per cent in the past 10 years. Britain's 2,130 miles of motorway may account for less than 1 per cent of our roads, but they carry 20 per cent of our traffic.

The relentless wear and tear that is caused by this traffic volume means that road authorities face the ongoing difficulty of ensuring that essential repairs and improvements to motorways are undertaken while at the same time traffic is kept flowing safely. In England, around 7 per cent of the motorway network (130 miles) has reached a point where repairs will be needed within four years.

Nothing makes a driver's heart sink faster than a 'Roadworks Ahead' sign. The delays, disrupted journey times and potential hazards that roadworks cause are a constant frustration to motorists and their passengers.

UK drivers will also come across roadworks when they drive in Europe, where individual countries often manage their sites quite differently. This can create additional risk and confusion.

Given that all motorists will encounter roadworks at some stage on their travels, the question that needs answering is: Do those responsible for the works do all that they can to make the experience for drivers as easy and risk free as possible? The EuroTest inspections are designed to provide the answer.

### **The survey**

EuroTest is a consortium of 16 European motoring organisations that undertakes annual inspections of services used by motorists across Europe\*. The AA Motoring Trust is a leading member.

In its second survey of roadworks, EuroTest inspectors looked at 53 major sites on motorways in 10 European countries between April and July 2006. The work was conducted by traffic experts from the University of Dresden, Germany in a specially-equipped vehicle making day-time and night-time assessments of the roadwork zone and approaches against pre-agreed criteria for signs and markings, traffic guidance, the road surface, night-time clarity and the information given to motorists.

The assessment criteria are shown in Section 17 of the full report.

### **How did Britain compare?**

EuroTest inspectors rated the layout and safety of UK sites as the best in Europe. The M42 near Birmingham, judged the best individual site inspected in 2006, was described as 'outstanding'. Awarded almost 100 per cent of the available marks, it was cited as an excellent example of roadwork safety. Inspectors highlighted for particular praise a 24-hour free tow-away breakdown service; well-signed permanent speed cameras that deterred speeding through the site; the condition, width and marking of traffic lanes; and clearly visible signs.

Four UK sites were rated 'Very good', four 'Good' and one 'Acceptable'.

All but one of the UK sites was inspected separately at night, reflecting the uniquely British practise of significantly re-organising sites after the evening rush hour to allow more intensive work to be undertaken when the traffic flow is lighter.

The standard of information given to motorists is a relatively minor part of the inspection. Nevertheless, it was one aspect of the UK sites that came in for criticism, particularly for a failure sometimes to inform motorists about the type of work and the reason for it, the length and duration of the roadworks, and the distance to the end of the site. Two of the nine UK sites rated 'Very poor' in this category. The more informed motorists are, the more positive an attitude they may take towards the roadworks and to the need to take care when driving through sites.

Inspectors reported a general improvement in standards across the whole of Europe since the 2005 study. This was reflected in the fact that in 2005 only one site was rated 'Very good', compared with 14 sites in 2006. A full table of results may be found in section 6 of the report.

### **How can Britain's motorway roadworks be further improved?**

- Explore the benefits of varying the speed limit to match prevailing conditions – when work stops at the weekend or overnight, for example. The survey shows that Britain undertakes a great deal of work on motorways at night to improve the day-time traffic flow. But speed limits nearly always stay the same, no matter what the layout is or how much work is going on.
- While the risk of a personal injury accident is greatly reduced at motorway roadworks compared to the past, there are still many accidents that result in vehicle damage and which, in different circumstances, could lead to death or serious injury. Official data is not kept on these, though a recent TRL report says that it should be. The Highways Agency (HA) should research the number and likely causes of damage-only accidents at motorway roadworks to determine if there are common themes.
- Drivers feel more secure, and risk of cross over is much reduced, if sites have solid barriers that can prevent vehicles straying into the path of oncoming traffic. Barriers are used more widely in other European countries to permit higher speeds, but work is often undertaken in a more inflexible manner than in Britain, with less night-time working, for example. The HA should review policy in this area to see if experience elsewhere in Europe can be adapted to suit British needs.
- The HA should pilot suitable innovative concepts that have emerged from the EuroTest research, such as the Austrian 'smiley face', Belgian's flag waving mannequin, and flashing warning lights.

*\*Since 2000, EuroTest has carried out inspections of more than 200 motorway service areas, 107 road tunnels and 60 car ferries. The EuroTest inspections have identified shortcomings and dangerous practices and have led to improvements that benefit road-users across the European Union. EuroTest results can be found on the AA Trust website [www.AAtrust.com](http://www.AAtrust.com)*

### 3 Key point summary

- This is the second year that EuroTest has examined roadwork sites across Europe. The inspections were designed to judge how safely and smoothly traffic was able to navigate road work sites
- 53 major European motorway roadwork sites, including nine in England, were inspected in 10 European countries
- The UK was judged the best country overall; the M42 near Birmingham was rated the top site
- 14 of the sites tested were rated ‘Very good’, 27 were ‘Good’, 7 ‘Acceptable’ and 5 ‘Poor’; none was rated ‘Very poor’
- The results showed a significant improvement on the 2005 results, when only one site was rated ‘Very good’, 18 ‘Good’, 25 ‘Acceptable’ and 6 ‘Poor’; none was rated ‘Very poor’
- The project was funded by the EuroTest consortium of 16 motoring organisations, of which the AA Motoring Trust is a leading member
- The tests were managed by ADAC (the German AA), and undertaken by highways experts from the University of Dresden
- The tests were carried out between 3 April and 5 July 2006

### 4 UK results

#### Overall rating

Roadworks	Overall rating
M42 nr Birmingham	Very good
M1 nr Hemel Hempstead	Very good
M1 nr Hemel Hempstead (night)	Very good
M25 nr Cheshunt	Very good
M5 nr Clevedon (night)	Good
M5 nr Clevedon	Good
M5 nr Taunton	Good
M25 nr Cheshunt (night)	Good
M42 nr Birmingham (night)	Acceptable

The rankings were calculated from a checklist of five categories, with points allocated in each and weighted in importance (see section 19 for scoring schedule).

Roadwork sites in the UK are often significantly re-organised at night to allow more intensive work during periods of reduced traffic flow. Because of this, it was not possible to make a direct comparison between day and night sites, so completely separate inspections were made at night where necessary.

### 5 UK versus the rest of Europe

	<u>European</u> roadwork sites	<u>UK</u> roadwork sites
Very good	14	4
Good	27	4
Acceptable	7	1
Poor	5	0
Very poor	0	0
Total	53	9

## 6 Results in order of rating by country

<b>Austria</b>		
Map	Road works site	Overall rating
1	A1 nr Pölsen	Very good
2	A1 nr Wien-Auhof	Very good
3	A1 nr Vorchdorf	Very good
4	A1 nr Seewalchen	Good
5	A1 nr Steyermühl	Good
6	A2 nr Modriach	Good
7	A10 nr Gmünd	Good
8	A12 nr Kufstein	Acceptable
<b>Switzerland</b>		
9	A12 nr Vevey	Good
10	AA2 nr Ersteld	Good
11	A2/A3 nr Basel	Good
12	A1 nr Oensingen	Acceptable
<b>Germany</b>		
13	A3 nr Montabaur	Very good
14	A57 nr Krefeld	Good
15	A8 nr Stuttgart	Good
16	A10 nr Berlin-Marzahn	Good
17	A96 nr Landsberg/Lech	Good
18	A1 nr Nonnweiler	Good
19	A70 nr Knetzgau	Good
20	A23 nr Itzehoe	Good
21	A72 nr Zwickau	Good
22	A93 nr Kiefersfelden	Acceptable
<b>Spain</b>		
23	A92 nr Granada	Very good
24	N2 nr Lleida	Very good
25	AP1 nr Burgos	Good
26	M6 nr Madrid	Poor
<b>France</b>		
27	A9 nr Perpignan	Very good
28	A7 nr Montélimar	Very good
29	A42 nr Lyon	Good
30	A7 nr Vienne	Good
<b>United Kingdom</b>		
31	M42 nr Birmingham	Very good
32	M1 nr Hemel Hempstead	Very good
33	M1 nr Hemel Hempstead	Very good
34	M25 nr Cheshunt	Very good
35	M5 nr Clevedon (night)	Good
36	M5 nr Clevedon	Good
37	M5 nr Taunton	Good
38	M25 nr Cheshunt (night)	Good
39	M42 nr Birmingham (night)	Acceptable

<b>Croatia</b>		
40	A3 nr Zagreb	Acceptable
41	A3 nr Novska	Poor
<b>Italy</b>		
42	A4 nr Novara	Good
43	A22 nr Trient	Acceptable
44	A 6 nr Mileto	Acceptable
45	E80 nr Rom-Trionfale	Poor
46	A3 nr Eboli	Poor
<b>Netherlands</b>		
47	A6 nr Almere-Buiten	Very good
48	A1 nr Apeldoorn	Good
49	A2 nr Weert	Good
50	A59 nr Waalwijk	Good
51	A12 nr Utrecht	Poor
<b>Portugal</b>		
52	A1 nr Porto	Very good
53	A2 nr Lisbon	Good

## 7 Rating in each category inspected - UK













Categories	M42 Birmingham	M1 Hemel Hempstead	M1 Hemel Hempstead (night)	M25 Cheshunt	M5 Clevedon (night)	M5 Clevedon	M5 Taunton	M25 Cheshunt (night)	M42 Birmingham (night)
Signing/ road markings	Good	Very good	Good	Very good	Good	Good	Very good	Acceptable	Very good
Traffic routing	Very good	Very good	Very good	Acceptable	Good	Good	Acceptable	Acceptable	Very poor
Road surface	Very good	Very good	Very good	Very good	Very good	Very good	Very good	Very good	Very good
Night-time clarity	*See note below	*See note below	Very good	*See note below	Good	*See note below	Very good	Very good	Very good
Information	Very good	Very good	Very good	Very good	Poor	Very poor	Very poor	Acceptable	Very good
Overall results	Very good	Very good	Very good	Very good	Good	Good	Good	Good	Acceptable

\*No rating: see results of additional night-time test carried out due to substantial re-organisation of the roadworks at night

## 8 Strengths and weaknesses of M42 near Birmingham (day-time inspection) Best test result

Overall rating	Very good
Location	M42 between Junction 10 (Tamworth) and Junction 9 (Curdworth)
Type of work	Resurfacing
Length of roadworks	0.62 miles
Work undertaken between	27 February-14 July 2006
Traffic direction	2+2
Test date	11 June 2006














### Strengths and weaknesses

-  Sufficient notice of roadworks ahead
-  Signs provided information on the type and duration of the work
-  Sufficient notice of reduced speed limit
-  No reduction in the number of traffic lanes throughout site
-  All the necessary traffic signs were in place, prominent, clean and in good condition
-  Very wide lanes
-  Good, clear road markings
-  The road surface was in a good, clean condition
-  Free breakdown tow-away service
-  Adequate safety protection for staff working on site
  
-  No flashing warning lights in advance of roadworks
-  Several points of entry/exit to the work site

## 9 Strengths and weaknesses of M1 near Hemel Hempstead (day-time inspections)

Overall rating	Very good
Location	M1 between Junction 6 (Watford-Bricket Wood) and Junction 10 (Luton South)
Type of work	Motorway widening
Length of roadworks	7 miles
Work undertaken between	March 2006-December 2008
Traffic direction	3+3/ 4+2
Test date	6 May 2006















### Strengths and weaknesses

-  Sufficient notice of roadworks ahead
-  Signs provided information on the type and duration of the work
-  Sufficient notice of reduced speed limit; signs clearly informed drivers of speed enforcement measures
-  Good visual guidance in the lead-in/exit tapers
-  All the necessary traffic signs were in place, prominent, clean and in good condition; signs showing the speed limit were provided at least every 1,000 metres
-  Very wide lanes in the direction of London
-  Good clear road markings
-  The road surface was in a good, clean condition
-  Two-way traffic was separated by guidance/protective barriers
-  Sufficient advanced notice of entry/exit points and acceleration/deceleration lanes provided
-  Free breakdown tow-away service
-  Adequate safety protection for staff working on site
  
-  No flashing lights in advance of roadworks

## 10 Strengths and weaknesses of M1 near Hemel Hempstead (night time inspection)

Overall rating	Very good
Location	M1 between Junction 6 (Watford-Bricket Wood) and Junction 10 (Luton South)
Type of work	Motorway widening
Length of roadworks	7 miles
Work undertaken between	March 2006-December 2008
Traffic direction	3+3/ 2+4/ 1+3
Test date	6 May 2006















### Strengths and weaknesses

-  Sufficient notice of roadworks ahead
-  Signs provided information on the type and duration of the work
-  Sufficient notice of reduced speed limit; signs clearly informed drivers of speed enforcement measures
-  Clear visual guidance in the lead-in/exit tapers
-  All the necessary traffic signs were in place, prominent, clean, and in good condition; signs showing the speed limit and banning overtaking were provided at least every 1,000 metres
-  Traffic lanes were clearly marked
-  The road surface was in a good, clean condition
-  Two-way traffic was separated by guiding/protective barriers
-  Free breakdown tow-away service
-  Adequate safety protection for staff working on site
-  Points of entry/exit were adequately illuminated, and traffic guidance and protection equipment was fitted with reflectors
  
-  No flashing lights to warning signs in advance of roadworks
-  Northbound, the left (slow) lane was closed, which made it difficult for slower traffic to merge with faster traffic in the other lanes
-  Southbound, the point of entry was controlled by a stop sign

## 11 Strengths and weaknesses of M25 near Cheshunt (day-time inspection)

Overall rating	Very good
Location	M25 between Junction 25 (Cheshunt) and Junction 26 (Waltham Abbey)
Type of work	Improvements to Junction 25 and refurbishment of the Holmesdale Tunnel
Length of road works	3.5 miles
Work undertaken between	May 2006-November 2007
Traffic direction	3+3
Test date	6 June 2006



















### Strengths and weaknesses

-  Sufficient notice of roadworks ahead
-  Signs provided information on the type and duration of the work
-  Sufficient notice of reduced speed limit; signs clearly informed drivers of speed enforcement measures
-  Good visual guidance in the lead-in/exit tapers
-  All the necessary traffic signs were in place, prominent, clean and in good condition; signs showing the speed limit and banning overtaking were provided at least every 1,000 metres
-  Traffic lanes were clearly marked
-  The road surface was in a good, clean condition
-  Two-way traffic was separated by guidance/protective barriers
-  Free breakdown tow-away service
-  Adequate safety protection for staff working on site
-  Points of entry/exit were adequately illuminated, and traffic guidance and protection equipment was fitted with reflectors
  
-  No flashing lights to warning signs in advance of roadworks
-  Reduction in the number of traffic lanes
-  Several points of entry/exit to the work site

## 12 Strengths and weaknesses of M5 near Clevedon (night-time inspection)

Overall rating	Good
Location	M5 between Junction 19 (Easton-in-Gordano) and Junction 20 (Clevedon)
Type of work	Construction of crawler lane
Length of roadworks	6.8 miles
Work undertaken between	October 2005 to June 2006
Traffic direction	3+3/ 1+1
Test date	9 June 2006
















### Strengths and weaknesses

-  Sufficient notice of roadworks ahead
-  Northbound signs provided information on the type and duration of the work
-  Sufficient notice of reduced speed limit; signs clearly informed drivers of speed enforcement measures
-  Adequate notice of traffic lane narrowing in advance of the taper area
-  Clear visual guidance in the lead-in/exit tapers
-  All the necessary traffic signs were in place, prominent, clean and in good condition; signs showing the speed limit and banning overtaking were provided at least every 1,000 metres
-  All of the original road markings had been removed
-  The road surface was in a good, clean condition
-  Sufficient advanced notice of entry/exit points, acceleration/deceleration lanes provided
-  Free breakdown tow-away service
-  Adequate safety protection for staff working on site
-  Points of entry/exit adequately illuminated; traffic guidance and protection equipment fitted with reflectors
  
-  No information southbound on the type and duration of the work
-  No flashing warning lights in advance of the roadwork site
-  Number of traffic lanes reduced
-  Lanes tapered without warning
-  Signs northbound reminding motorists of a ban on overtaking were positioned more than 1,000 metres apart
-  Several points of entry/exit to the work site

### 13 Strengths and weaknesses of M5 near Clevedon (day-time inspection)

Overall rating	Good
Location	M5 between Junction 19 (Easton-in-Gordano) and Junction 20 (Clevedon)
Type of work	Construction of crawler lane
Length of road works	6.8 miles
Traffic direction	3+3/ 4+3
Work undertaken	October 2005-June 2006
Test date	9 June 2006
















#### Strengths and weaknesses

-  Sufficient notice of roadworks ahead
-  Northbound signs provided information on the type and duration of the work
-  Sufficient notice of reduced speed limit; signs clearly informed drivers of speed enforcement measures
-  Clear visual guidance in the lead-in/exit tapers
-  All the necessary traffic signs were in place, prominent, clean and in good condition; signs showing the speed limit and banning overtaking were provided at least every 1,000 metres
-  Traffic lanes were clearly marked
-  Road surface was in a good, clean condition
-  Sufficient advanced notice of entry/exit points; acceleration/deceleration lanes provided
-  Free breakdown tow-away service
-  Adequate safety protection for staff working on site
  
-  No information southbound on the type and duration of the work
-  No flashing warning lights in advance of the roadwork site
-  Number of traffic lanes reduced southbound
-  Very narrow left (slow) lane northbound
-  Several points of entry/exit to the work site

## 14 Strengths and weaknesses of M5 near Taunton (day and night-time inspections)

Overall rating	Good
Location	M5 between Junction 25 (Taunton) and Junction 26 (Wellington)
Type of work	Motorway refurbishment
Length of road works	4 miles
Traffic direction	2+2
Work undertaken	April-June 2006
Test date	10 June 2006















### Strengths and weaknesses

-  Sufficient notice of roadworks ahead
-  Signs provided information on the type and duration of the work
-  Sufficient notice of reduced speed limit; signs clearly informed drivers of speed enforcement measures
-  All the necessary traffic signs were in place, prominent, clean and in good condition; signs showing the speed limit and banning overtaking were provided at least every 1,000 metres
-  Traffic lanes were clearly marked, with all the original lane markings removed
-  The road surface was in a good, clean condition
-  Points of entry/exit could be recognised in time; acceleration/deceleration lanes provided
-  Free breakdown tow-away service
-  Adequate safety protection for staff working on site
-  Points of entry/exit were adequately illuminated; traffic guidance and protection equipment fitted with reflectors
  
-  No information on the type and duration of the work
-  No flashing warning lights in advance of the roadwork site
-  Number of traffic lanes reduced southbound
-  Northbound motorway exit located immediately after lane tapering
-  The work area was separated only by traffic cylinders

## 15 Strengths and weaknesses of M25 near Cheshunt (night-time inspection)

Overall rating	Good
Location	M25 between Junction 25 (Cheshunt) and Junction 26 (Waltham Abbey)
Type of work	Improvements to Junction 25 and the refurbishment of Holmesdale Tunnel
Length of road works	3.5 miles
Work undertaken between	May 2006-December 2007
Traffic direction	1+0/ 1+3
Test date	6 June 2006














### Strengths and weaknesses

-  Sufficient notice of roadworks ahead
-  Signs provided information on the type and duration of the work
-  Sufficient notice of reduced speed limit; signs clearly informed drivers of speed enforcement measures
-  All the necessary traffic signs were in place, prominent, clean and in good condition; signs showing the speed limit and banning overtaking were provided at least every 1,000 metres
-  Most of the original road markings had been removed
-  Road surface was in a good, clean condition
-  Points of entry/exit could be recognised in time; acceleration/deceleration lanes provided
-  Free breakdown tow-away service
-  Adequate safety protection for staff working on site
-  Points of entry/exit were adequately illuminated; traffic guidance and protection equipment was fitted with reflectors
  
-  No flashing warning lights in advance of roadwork site
-  Number of traffic lanes reduced
-  No flashing warning lights in advance of roadwork site
-  Inadequate lane markings
- In the direction of Cheshunt the traffic lanes and the work area were not adequately separated

## 16 Strengths and weaknesses of M42 near Birmingham (night-time inspection)

Overall Rating	Acceptable
Location	M42 between Junction 10 (Nottingham) and Junction 9 (Curdworth)
Type of work	Bridge refurbishment
Length of road works	0.62 miles
Work undertaken between	27 February-14 July 2006
Traffic direction	1+2
Test date	11 June 2006

### Strengths and weaknesses

-  Sufficient notice of roadworks ahead
-  Signs provided information on the type and duration of the work
-  Sufficient notice of reduced speed limit
-  All the necessary traffic signs were in place, prominent, clean and in good condition
-  Traffic lanes were clearly marked
-  Road surface was in a good, clean condition
-  Free breakdown tow-away service
-  Points of entry/exit were adequately illuminated; traffic guiding and protection equipment was fitted with reflectors
  
-  No flashing warning lights in advance of roadwork site
-  Inadequate advanced information about lane reductions
-  Lane closures made it difficult for traffic entering the motorway to merge into busy traffic lanes
-  The work area was separated only by traffic cylinders
-  Several points of entry/exit to the work site

## 17 Results: A comparison in the test categories

‘Outstanding’ was the inspector’s opinion of the day-time layout of the roadwork site on the M42 near Birmingham. The site, which was rated ‘Very good’, received almost 100 per cent of the available score – inspectors found clearly visible signs; wide traffic lanes, clearly marked and in good condition; and the work areas safely separated. Inspectors cited the works as an excellent example of roadwork site safety.

The layout of UK roadwork sites is often extensively altered at night, to enable work to be undertaken more intensively during periods of reduced traffic flow. Inspectors undertook separate day and night inspections as site reorganisation made it difficult to directly compare the day and night layout of sites. The M42 site was judged ‘Acceptable’ when inspected during night-time.

Congratulations must go to all the UK sites for their high standards, which led to the UK being judged the best country overall in the 2006 inspections.

This year’s overall results show a huge improvement on 2005. Of the 50 sites inspected last year, only one received a rating of ‘Very good’. In 2006, 14 sites were rated ‘Very good’ and another 27 were judged ‘Good’ – more than 77 per cent of the 53 sites inspected. In 2005, half the sites were rated ‘Acceptable’ compared with just seven in 2006. Only five sites were judged ‘Poor’ in this year’s inspections compared with six sites in 2005. No sites were judged ‘Very poor’ in either year.

Worst of the sites inspected this year was on the A3 (Cosenza-Salerno near Eboli) in Italy. Inspectors found, among other criticisms, that lane markings were confusing, the work area was not sufficiently separated from the traffic lanes, and the night-time layout was poor. Second worst was the A6 (Madrid-Collado-Villalba) in Spain, followed by the A12 (Utrecht-The Hague) in the Netherlands. All the sites rated ‘Poor’ had similar shortcomings.

A brief look at the individual categories shows that, on the whole, ‘Signs and road markings’ and ‘Road surface’ had the highest ratings. There were a few exceptions in the Netherlands, Spain and Croatia in the first category, and Portugal and Croatia were somewhat lax in the ‘Road surface’ category. Inspectors also found that the traffic restrictions were sometimes not removed at the end of the works site.

On the negative side, night-time site layout and traffic routing were judged by the inspectors to be generally unsatisfactory. Night-time layouts were frequently confusing. The inspectors also identified a lack of warning lights in the lead-in/exit tapers or at the points of entry/exit, and a lack of reflective lane markings, which together with confusing lane markings, could make navigation through the works difficult. Narrow traffic lanes and, in some cases, two-way traffic that was not safely separated was identified as being potentially dangerous, as were entry/exit points without acceleration and deceleration lanes (in some cases stop signs were used to control entry to the roadwork site). Some sites had several points of entry and exit for construction vehicles, which could also obstruct traffic flow.

Traffic routing was also found to be unsatisfactory. Traffic lanes were frequently closed, and while this is often unavoidable, it can cause difficulties for merging vehicles depending on the traffic management techniques used, which frequently varied.

Like last year, the poorest results were recorded in the ‘Information’ category. The inspectors found that motorists were often inadequately informed about the reason, duration and total length of the roadwork site – though as we commented in last year’s report, this is probably more of an annoyance than a positive danger.

Despite a need for improvement in some areas, a large majority of sites were judged to be satisfactory and safe. Accidents do happen, however, though these are often due to motorist behaviour. The ARROWS study (Advanced Research on Road Work Zone Safety Standards in Europe) found that motorists believe that they do take sufficient care, and slow down adequately when passing through works sites. Studies and observations clearly show, however, that many do not in fact adapt their behaviour as they claim.

Roadworks are an ongoing regrettable necessity as highway authorities strive to adapt and improve the road network to meet today's needs and standards. While motorists must do their bit by taking special care when driving through roadworks, the authorities must design and manage sites with safety as the top priority.

### The categories in detail

#### Signs and road markings

	Very good	Good	Acceptable	Poor	Very poor
<b>UK total</b>	<b>4</b>	<b>4</b>	<b>1</b>	<b>-</b>	<b>-</b>
<b>Total across Europe</b>	<b>21</b>	<b>24</b>	<b>7</b>	<b>1</b>	<b>-</b>

#### Traffic Routing

	Very good	Good	Acceptable	Poor	Very poor
<b>UK total</b>	<b>3</b>	<b>2</b>	<b>3</b>	<b>-</b>	<b>1</b>
<b>Total across Europe</b>	<b>6</b>	<b>13</b>	<b>16</b>	<b>12</b>	<b>6</b>

#### Road Surface

	Very good	Good	Acceptable	Poor	Very poor
<b>UK total</b>	<b>9</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>
<b>Total across Europe</b>	<b>37</b>	<b>7</b>	<b>5</b>	<b>4</b>	<b>-</b>

#### Night time clarity

	Very good	Good	Acceptable	Poor	Very poor
<b>*UK total</b>	<b>4</b>	<b>1</b>	<b>-</b>	<b>-</b>	<b>-</b>
<b>Total across Europe</b>	<b>13</b>	<b>10</b>	<b>7</b>	<b>11</b>	<b>8</b>

\*Four of the five UK sites were subjected to separate day and night inspections. Uniquely in Europe, UK roadworks are frequently significantly re-ordered at night to allow more intensive work to be undertaken during periods of reduced traffic flow. This makes a direct comparison between day and night difficult to achieve.

#### Information

	Very good	Good	Acceptable	Poor	Very poor
<b>UK total</b>	<b>5</b>	<b>-</b>	<b>1</b>	<b>1</b>	<b>2</b>
<b>Total across Europe</b>	<b>14</b>	<b>1</b>	<b>8</b>	<b>7</b>	<b>23</b>

## 18 Ten countries put to the test: mostly good news, but still some need for improvement

In Austria, smiley faces guide motorists through a roadwork site. In the UK, roadwork zones look completely different at night compared to during the day. In Croatia, traffic restrictions are not immediately removed at the end of the roadwork site. And in Italy, motorists are sometimes surprised by very steep lane tapers. Each country has its unique peculiarities when it comes to roadworks, and no uniform European standard exists. This was one of the main findings of the second road works inspection undertaken by the EuroTest programme across 10 European countries.

The following highlights the central findings from each country:

### Austria

Three sites were rated 'Very good', four 'Good' and one 'Acceptable'.

Inspectors found that

- There was potential for confusion because the original road markings were frequently not removed
- The points of entry were controlled by a stop sign, with no acceleration lane, which meant that motorists had to go from a standing start to 80 kph in order to merge with flowing traffic
- Night-time site layout was inadequate – flashing lights designed to warn motorists in advance of the site were sometimes far too bright, road markings were only rarely reflective and most of the points of entry and exit were not illuminated

However

- Beacons with arrows indicated clearly highlighted lane reductions and tapering
- Information provided was mixed: two sites were rated 'Very poor' while four were rated 'Very good' (inspectors were particularly impressed by the faces that featured a drooping mouth at the beginning of the work site which gradually transformed into a big grin at the end)

According to the site operator, daily newspapers and radio announcements inform motorists of the start and completion dates of major roadworks. The private motorway operator ASFINAG also uses the Internet: ([www.asfinag.at](http://www.asfinag.at)) to publish information. Workers on site are trained to deal with emergencies and emergency plans were in place for the sites inspected. Most of the sites were checked at least every eight to 12 hours. Staff were available 24 hours a day and could be on-site within one hour. Traffic was monitored and speed limits were enforced.

### Switzerland

Three sites were rated 'Good' and one 'Acceptable'.

Inspectors found that

- Motorists were given insufficient warning that they were approaching roadworks
- Traffic lanes were not always clearly marked
- Work areas were not adequately separated from traffic
- Traffic lanes were not always clearly marked
- Night-time clarity was unsatisfactory, flashing warning lights were not in place and some taper areas and points of entry and exit were not illuminated
- Swiss roadwork operators supplied no information concerning the sites

However

- Lay-bys with emergency phones were in place throughout the sites

According to the operator, the radio, daily newspapers and the Internet sites of the individual canton administrations inform motorists of the start and completion dates of major roadworks and of changes during the work. Motorists are also given information and advice on how to behave when driving through roadworks. Roadwork staff are trained to deal with emergencies and a list of emergency

numbers was available at the sites inspected. Sites were checked regularly, usually both day and night, by video surveillance and through staff inspections; staff could be on-site within one hour to deal with emergencies. Traffic was monitored and speed limits were enforced.

## **Germany**

One of the sites were rated 'Very good', eight 'good' and one 'Acceptable'..

Inspectors found that

- Lay-bys were not generally available
- Points of exit were frequently without a deceleration lane and points of entry were controlled by a stop sign with no acceleration lane available
- Only road markings separated the two-way traffic at one of the sites inspected
- Like several neighbouring countries, the night-time layout of roadwork sites was not sufficiently clear
- Inspectors were critical of the fact that the original road markings had not been removed, and of the points of entry and exit, which were not illuminated
- Little information was given regarding the duration and length of the roadwork sites (at one site no information at all was provided)

However

- Traffic signs and lane markings were general satisfactory and road surfaces were in a good, clean condition.

According to the operator, daily newspapers and the Federal Ministry of Transport website ([www.bmvbs.de](http://www.bmvbs.de)) inform motorists of any major roadworks; the Internet sites of the federal states also provide information. Staff are trained to deal with emergencies and a list of emergency numbers was available at the sites inspected. The sites were checked at least every eight to 12 hours and additionally during particular conditions, such as a storm or an accident. Staff could be on-site within one hour. Traffic was monitored and speed limits were enforced.

## **Spain**

Four sites were rated 'Very good', one 'Good' and one 'Poor'.

Inspectors found that

- Signs were often positioned too near to the ground, which made them difficult to see, especially when the traffic was bumper-to-bumper; these signs were frequently knocked down by passing vehicles
- Speed limit and overtaking information was often confusing
- On one site, the work area was separated only by traffic cylinders, several of which had been flattened by passing traffic
- lane closures caused difficulties for traffic merging into busy traffic lanes
- Traffic lanes were frequently closed, and while this is often unavoidable, it can depending on the traffic management techniques used, which frequently varied.
- Little information was given regarding the duration and length of the roadwork sites

However

- Inspectors awarded top scores to the night-time layout of Spanish sites. Road markings, traffic guidance and protection equipment were clear and reflective and warning lights were not too bright, which made it easy to navigate the site easy at night
- Top marks were also given for the condition of traffic lanes, which were clean, in a good condition and very wide.

The operator provided no details of the information given to motorists about the site or of emergency management and procedures.

## France

Two sites were rated 'Very good' and two 'Good'.

Inspectors found that

- Like Spain, signs were difficult to see, especially when traffic was bumper-to-bumper; in addition, the signs were frequently knocked down by passing vehicles
- Again like Spain, inspectors were critical of sites where lane closures caused difficulties for traffic merging into busy traffic lanes
- At night, some flashing warning lights were defective and there were no warning lights in the lane tapers
- Little information was given regarding the duration and length of the roadwork sites
- Points of entry and exit were not lit
- Insufficient information was given regarding the duration and length of the roadwork sites

However

- In general, the inspectors commended the state and position of signs and road markings
- Top scores were awarded to each site for the condition and cleanliness of their traffic lanes
- Inspectors also commended the use of concrete guiding walls to protect site workers and gave drivers good visual guidance

The operator provided no details of the information given to motorists about the site or of emergency management and procedures.

## United Kingdom

Four of the nine sites inspected were judged 'Very good', including the M42 which was particularly commended and receiving almost a 100 per cent of the total possible score. Four were judged 'Good' with more than 90 per cent, and one was judged 'Acceptable'. The UK was rated as the best country in the 2006 inspections.

Unlike many other European countries, roadwork sites in the UK are often completely rearranged at night, often with reduced traffic lanes, to allow more intensive work to be undertaken during periods of reduced traffic flow.

Inspectors found that

- Lane closures caused difficulties for traffic merging into busy traffic lanes
- There were frequently too many entry/exit points to the work site
- There were no flashing warning lights in advance of the roadworks

However

- All nine sites received top marks for the cleanliness and condition of traffic lanes
- Inspectors also commended the 24-hour free tow-away service, which enables the prompt removal of broken-down vehicles
- Speed cameras were permanently installed and well signed across the majority of UK sites
- Despite two sites being rated 'Very poor' in the Information category, the majority of sites were judged to be 'Acceptable' or better.

According to the operator, daily newspapers and the radio give motorists advance warning of the start and finish dates of roadworks. Information is also available on the Internet at [www.highways.gov.uk](http://www.highways.gov.uk).

Roadworks staff were trained to deal with emergencies and a list of emergency numbers was available at the sites checked. The sites were video-monitored: the M1 roadworks, for instance, was checked every two hours. Any shortcomings in roadworks safety could be dealt with around the clock, and staff could be on-site within one hour. Traffic was monitored and speed limits were enforced.

## **Croatia**

One site was rated 'Acceptable' and one 'Poor'.

Inspectors found that

- Neither two-way traffic nor the work areas were adequately separated
- Frequently there were no acceleration and deceleration lanes at the points of entry and exit
- Information signs were infrequent and misleading
- Road surfaces were in poor condition
- Navigation through sites at night was difficult as lane markings were not always reflective and original lane markings had not always been removed
- Information on sites was frequently non-existent.

The operator provided no details of the information given to motorists about the site, or of emergency management and procedures.

## **Italy**

One site was rated 'Good', two 'Acceptable' and two 'Poor'.

Inspectors found that

- Speed limits through the sites were reduced to 40 or 60 kilometres per hour, which hindered traffic flow
- Lane tapers were too short and too sharp, leading to abrupt reductions in speeds
- Neither two-way traffic nor work areas were adequately separated
- Points of entry and exit were frequently difficult to see and acceleration or deceleration lanes were missing; on some sites it was necessary to stop at entry points, which could result in problems for merging traffic
- Information about the works was inadequate
- Night-time clarity differed significantly between sites, with results ranging from 'Very good' to 'Very poor'
- Speed reductions were too abrupt and two-way traffic was sometimes separated only by traffic cones

However

- Sites scored well in the Traffic routing category
- Traffic lanes were clean and in good condition

The operator provided no details of the information given to motorists about the site, or of emergency management and procedures.

## **The Netherlands**

One site was rated 'Very good', three 'Good' and one 'Poor'.

Inspectors found that

- Results in the Traffic routing category were mixed; marks were lost because most sites did not provide lay-bys
- Two-way traffic was not adequately separated
- Sites were inadequate signed and road markings were confusing

However

- Night-time clarity was generally good
- Information provided was generally satisfactory

According to the operators, daily newspapers and radio announcements inform motorists about the start dates of any major roadworks. During the construction phase, information is continuously provided on the Internet at [www.vanAanarbeter.nl](http://www.vanAanarbeter.nl).

Staff are trained to deal with emergencies and a list of emergency numbers was in place at the sites inspected. Most sites were checked every 24 hours and any shortcomings could be dealt with around the clock within one hour. Traffic was monitored on most sites and speed limits were enforced.

## **Portugal**

One site was rated 'Very good' and one 'Good'

Inspectors found

- Several points of entry and exit made it difficult to navigate the site
- The road condition was not satisfactory

However

- Inspectors commended the night-time layout of the sites, which were easy to navigate
- Lay-bys with emergency phones were in place throughout the sites
- The condition of signs, lane markings and traffic routing throughout the works was satisfactory
- The provision of information was also satisfactory.

The operator provided no details of the information given to motorists about the site, or of emergency management and procedures.

## 19 EuroTest methodology: how we tested

2006 was the second year that EuroTest, the international consumer testing programme, inspected motorway roadwork sites. All of the sites tested were long-term roadworks on main European travel routes. The shortest roadwork zone was one kilometre long, the longest 22 kilometres.

A total of 53 sites were inspected in 10 European countries: 10 in Germany; nine in the UK (four sites underwent separate day and night inspections), eight in Austria, five each in Italy and the Netherlands, four each in France, Switzerland and Spain and two each in Portugal and Croatia.

ADAC (the German AA), which oversaw the project, commissioned the Transport Infrastructure Institute at Dresden University of Technology to undertake the inspections. Roadworks were visited between 3 April and 5 July 2006 and assessments were done in both directions, at least twice during the day and once at night.

A BMW 525d Touring fitted with state-of-the-art measuring systems was used in the test. Equipment included a positioning system (comprising GPS, a reference station, inertial system and position measuring device); digital stereo cameras with their own dedicated computers for storing images to measure distances and lane widths; an analogue scenery camera; and a central measuring computer.

The roadwork zone was generally measured during the day, except in the UK where measuring was also carried out at night due to changed traffic routing. The position of signs and the location of lay-bys and other features were recorded using a computer with a touchscreen. The data was collected, documented on video, both in digital and analogue form, and subsequently analysed in the laboratory.

The ARROWS study (Advanced Research on Road Work Zone Safety Standards in Europe) — carried out on behalf of the European Commission — is the only basic study in Europe to have been undertaken on this topic. A practical handbook with recommendations for uniform European safety standards for roadwork sites was the outcome of the ARROWS study. This handbook was used by EuroTest and traffic experts to develop a comprehensive checklist. The checklist contains, for instance, not only the most important safety-related issues, but also matters concerning the layout and quality of a roadwork site. These were broken down into: approach and work zone, reduction and tapering of lanes, entry and exit points, and the end of the roadworks. After each measurement, a digital questionnaire was completed on site.

### Using the checklist, the following five theme blocks were checked

#### Signs/road markings

**Weighting: 40 percent**

- \* Signs in advance of the roadwork site
- \* Signs through the roadwork site
- \* Signs at the end of the roadwork site
- \* The frequency, clarity, easy recognition and condition of road signs
- \* The quality of road markings and their clarity

#### Traffic routing

**Weighting: 40 percent**

- \* Width of traffic lanes
- \* Lane reductions
- \* Lane narrowing and contra-flow
- \* Points of entry/exit within the roadwork site
- \* Point of entry/exit for roadwork vehicles
- \* Safety-relevant equipment

#### Road surface

**Weighting: 5 per cent**

- \* Condition
- \* Cleanliness

#### Night-time clarity

**Weighting: 10 per cent**

- \* Visibility of signs and road markings
- \* Protective equipment with reflectors
- \* Illumination of the lead-in/exit tapers

**Information****Weighting: 5 per cent**

- \* Information about the type and duration of roadworks
- \* Information repeated throughout the length of the roadworks

The roadwork zones were assessed on the basis of a points system with the following ratings: Very good, Good, Acceptable, Poor and Very poor.

**Risk potential**

In addition to the above, this year's test also included, for the first time, the risk potential of a roadwork site. Lane reduction, tapering to the opposite lane, two-way traffic or points of entry and exit are obviously relevant when it comes to the risk of an accident at a site. Sites with a low risk received a bonus of up to 10 per cent and were thus able to compensate for their sometimes lower standard of safety measures.

## 20 International co-operation with European motoring clubs

The 2006 roadwork inspections were carried out within the scope of the international EuroTest programme. A total of 16 motoring clubs, coordinated by the FIA (Fédération Internationale de l'Automobile) took part in the inspection. ADAC was responsible for the performance and methodological management of the test. The results will be published by all the partner clubs.

United Kingdom  
The AA Motoring Trust  
[www.AAtrust.com](http://www.AAtrust.com)

Germany  
ADAC  
[www.adac.de](http://www.adac.de)

Belgium  
TCB  
[www.touring.be](http://www.touring.be)

Denmark  
FDM  
[www.fdn.dk](http://www.fdn.dk)

Finland  
AL  
[www.autoliitto.fi](http://www.autoliitto.fi)

France  
FFAC  
[www.automobileclub.org](http://www.automobileclub.org)

Italy  
ACI  
[www.aci.it](http://www.aci.it)

Croatia  
HAK  
[www.hak.hr](http://www.hak.hr)

Netherlands  
ANWB  
[www.anwb.nl](http://www.anwb.nl)

Norway  
NAF  
[www.naf.no](http://www.naf.no)

Austria  
ÖAMTC  
[www.oeamtc.at](http://www.oeamtc.at)

Portugal  
ACP  
[www.acp.pt](http://www.acp.pt)

Switzerland  
TCS  
[www.tcs.ch](http://www.tcs.ch)

Slovenia  
AMZS  
[www.amzs.si](http://www.amzs.si)

Spain  
RACE  
[www.racenet.es](http://www.racenet.es)

Catelonia  
RACC  
[www.racc.es](http://www.racc.es)

## **21 Recommendations to make roadwork sites safer**

### **Planners and operators should**

- Install traffic signs showing the length, duration and reason for the roadworks in advance of the roadwork site, as well as regular signs through the works to give motorists advanced warning of what is ahead
- Ensure that traffic signs both in advance of the roadwork site and through the site are of similar appearance, to avoid confusing motorists
- Inform motorists well in advance of lane reduction and tapering, enabling them to adapt their behaviour accordingly
- Consider adding additional lane routing within the tapered area, such as reflecting guidance beacons with arrows or curve signs so that traffic lanes can be clearly identified at night
- Remove all road markings from the former traffic lanes, at least in critical areas such as steep taper zones, so that motorists can clearly follow the new road layout
- Install rumble strips ahead of critical areas, so that motorists can reduce their speed in time
- Put physical barriers in place to separate two-way traffic lanes, using mobile safety barriers made of steel or concrete to prevent vehicles from crossing into oncoming traffic
- Put physical barriers in place to protect on-site road workers
- Install emergency telephones in lay-bys or provide a 24-hour tow-away service so that broken-down vehicles cause as little traffic congestion as possible
- Shift certain construction phases to times of low-traffic flows (for example, at night) so that traffic is disrupted as little as possible

### **Administrations and politicians should**

- Put in place a standard analysis of accidents at roadwork sites throughout Europe to enable its findings to lead to the safer installation of roadwork sites, giving special consideration to motorists' perceptions of roadwork sites and how difficult they find navigating the sites
- Produce guidelines for roadwork site equipment, such as site design and traffic signs, to bring about a standardised system across Europe as far as possible
- Not skimp on funding roadworks to the detriment of safety
- Earmark sufficient funds at a European level for accident research in this area.

## How to drive safely through roadwork sites

Drivers should

- Seek information on roadwork sites before setting off, especially when travelling outside their home country. Be prepared for different rules, road markings in different colours (for instance, white, yellow, orange or red) and for unfamiliar and poorly visible traffic signs. In some countries, traffic signs are positioned near the ground
- Keep strictly to speed limits, and obey all traffic signs and instructions
- Keep a good distance from the vehicle in front and drive carefully, paying attention to the road ahead. This is particularly important in the case of one-lane traffic routing, where there is no room to swerve out of the way if the vehicle in front comes to a sudden halt. The most frequent accident at roadwork sites is the rear-end collision
- Expect the unexpected and the unfamiliar, above all, in the lead-in/exit tapers. These areas are often extremely short and steep, particularly in Spain and Italy
- Remember that in some countries drivers are required by law to observe the so-called *zipper system* of merging when lanes are closed. This means remaining in the lane until the road narrows, checking the mirror, indicating and then merging alternately with traffic in the other lane, like a zipper closing
- Remember that a wide HGV or a car and trailer will need more room at the beginning of the lead-in/exit tapers
- Where possible remain in the inside lane. This lane is usually wider than the off-side lane and is more likely to avoid conflict with oncoming traffic
- Overtake only if you are allowed to, and if you feel that you are capable of doing so. Remember that the off-side lane is often narrower than the inside lane
- Concentrate fully when driving through roadworks
- In the event of a breakdown, switch on the hazard warning lights immediately. If there are no lay-bys, or if these are impossible to reach, try to park the vehicle as close to the inside edge of the road left as possible. You and your passengers should then immediately leave the vehicle by the passenger door and find a safe place to wait. Be aware of heavy vehicles, works machinery, and other dangers. In Italy, Spain, Portugal and Austria, all passengers must put on reflective vests before they leave the vehicle. Do not attempt to push your vehicle. A puncture should be treated in the same way as a breakdown
- Take extra care when work is being carried out at night, and be prepared for the transition from the illuminated working area to unlit motorway