Up to the Mark 2003?

THE SUMMARY REPORT OF THE 2003 RSMA SURVEY OF UK ROAD MARKINGS

PUBLISHED BY:
THE ROAD SAFETY MARKINGS ASSOCIATION,
BURY BUSINESS CENTRE, KAY ST. BURY, LANCS.
TEL: 0161 763 7711 FAX: 0161 763 7722

SECTION 1: INTRODUCTION

The RSMA 'Up to the Mark 2003?' Ecodyn Survey is the fifth national survey commissioned by the Association since 1996, covering a representative sample of road markings over nearly 1000 km of roads in England & Scotland. Since 2001 the survey has been conducted on an annual basis, in order to provide a more accurate indication of on going condition of the primary road safety feature on our roads across the country.

The latest survey was undertaken in October in order to ensure the most current data was available for the RSMA Conference and as a result of weather constraints; this report is based on a reduced sample of 737 kilometres. As a consequence all comparative data has been adjusted and re-analysed to provide a like for like comparison across 2001, 2002 and 2003

SECTION 2: EXECUTIVE SUMMARY – 2003 SURVEY

The 2003 survey indicates mixed trends since the last survey with the different road categories generating different patterns of results. The survey identifies that using proposed new Highways Agency (HA) standard TD26 some 29% (37% in 2002) of road markings fall below the 80mcd intervention level and require replacement. This figure rises to 47% (56% in 2002) for markings that fall into the investigatory category of less than 100mcd, designated in TD26.

These figures identify some improvement from the poor results recorded in 2001 and 2002, however, as indicated above there are inconsistencies within the categories with significant improvements on the motorway network and noticeable improvement in dual carriageways, whilst there has been a marginal deterioration on the already poor single carriageway network of 'A' roads.

Motorways:	11% of markings below proposed national standard intervention level (26% in 2002) of 80mcd
'A' Roads (Dual Carriageways):	33% of markings below proposed national standard intervention level (44% in 2002) of 80mcd
'A' Roads (Single Carriageway):	42% of markings below proposed national standard intervention level (40% in 2002) of 80mcd

The results of the 2003 Survey indicate that the concerns expressed in previous survey reports about the medium term performance of the marking infrastructure in the UK maybe starting to be addressed by overseeing organisations responsible to the Highways Agency, although only a significant reduction of the number of markings below 80mcd on dual carriageways in succeeding years will confirm this as a trend. Conversely there is little evidence to suggest that local authorities have to date started to address the significant under performance of their road marking infrastructure, a problem that TD26 will only serve to further emphasise.

From a technical perspective the figures available for analysis over the three year period allow for a rudimentary maintenance model to be developed that identifies a pattern of wear on the roads surveyed and it may be possible that such analysis could lead to more accurate prediction of maintenance requirements and consequently maintenance budgets. Moreover the data can also be used to identify different patterns of performance and consequently maintenance on different parts of the same road.

The RSMA believe that the results indicate the important role of surveying in enhancing road safety and additionally the significance of TD26 in providing a regime of monitoring and maintenance. As a direct output from the 2003 results and analysis of the databank from surveys up to and including 2003, the RSMA recommends.

- The earliest possible publication of TD26 and further that it should become not only a required document for Highways Agency use, but in the interests of road safety, also be designated a required standard to be implemented by all local authorities.
- The development by the HA, in co-operation with its agents and industry, of an implementation plan for TD 26 in order to manage the resource issues raised by findings of consecutive RSMA surveys. This would build on the already successful partnership approach adopted by the HA and RSMA over the last 18 months.
- That the HA require all maintenance agents responsible for roads highlighted in this report to provide a written response to the issues raised in the report. Including, where appropriate, details of the action undertaken where improvements have been identified.
- The publication of TD26 should be followed up with work to assist specifiers in developing models for predictive maintenance.
- Action should be taken to ensure Highways Agency and Local Authority specifiers specify road markings to the new European Standards and performance for road users requirement, as evidence exists that many specifiers are still using redundant standards.

SECTION 3: METHODOLOGY

The survey was undertaken using an Ecodyn machine operated by Prismo Contracting Services Ltd. and commissioned by the Road Safety Markings Association. The equipment operates at 30m geometry, in line with the requirements specified in the relevant European Standards operated in the UK

Where reference is made to road markings or markings throughout this report they should be taken to represent the following road markings as measured:

Motorways:	Markings delineating lanes on motorways.
'A' roads dual carriageways:	Markings delineating the two lanes on the dual carriageway.
'A' roads single carriageway:	Markings delineating the two lanes.

The test circuit analysed for this report comprised of 737 km of roads. The overall test circuit is one of 1000km, although the balance of the Survey remains to be completed.

The survey results compared in this report are based on a total meterage of roads broken down as follows:

	2001	2002	2003
Motorway:	352.3 km	336.9km	336.9km
Dual Carriageways:	236.6 km	227.8km	227.8km
A Roads:	186.3 km	172.7km	172.6km
Total	775.2 km	737.4km	737.3km

Due to the change in geometry for retro-reflectivity measurement that accompanied the introduction of European Standards for road markings, previous surveys from 1996 and 1998 cannot be accurately compared with 2001,2002 and 2003 survey results. The data for each (type of) road is therefore presented only with the equivalent data from 2001, 2002 and 2003 alongside it.

SECTION 4: THE 2003 SURVEY RESULTS

The 2003 Survey results are compared with the results obtained over the same circuit of roads in 2001and 2002, with the 2001 figures representing baseline, as they were the first to the new 30m geometry. The 80mcd/m2/lux level is that identified by the Highways Agency as the intervention point for road markings in the draft TD26 Maintenance Document.

CUMULATIVE Type of road	Km surveyed 2001	Km surveyed 2002	Km surveyed 2003	%age lines below 100mcd/ m2lx 2001	%age lines below 100mcd/ m2lx 2002	%age lines below 100mcd/ m2lx 2003	%age lines below 150mcd/ m2llx 2001	%age lines below 150mcd/ m2llx 2002	%age lines below 150mcd/ m2llx 2003	%age lines below 80mcd/ m2lx 2001	%age lines below 80mcd/ m2lx 2002	%age lines below 80mcd/ m2lx 2003
MOTORWAY	352.3	336.9	336.9	39	43	35	88	67	78	15	26	11
DUAL 'A' ROADS	236.6	227.8	227.8	38	66	48	84	89	70	16	44	33
SINGLE 'A' ROADS	186.3	172.7	172.6	48	58	58	91	81	71	15	40	42
ALL ROADS (Weighted Average)	**775.2**	**737.4**	**737.3**	**41**	**54**	**44**	**80**	**81**	**74**	**16**	**34**	**25**

Figure 4.1

Figure 4.1 identifies the proportion of markings falling below the 80mcd/m2lx threshold along with an additional analysis for markings below 100mcd/m2/lx and 150mcd/m2lx for each road category, with the ALL ROADS total representing a weighted average for all markings.

The 100mcd/m2/lx level is the Highways Agency proposed investigatory level within TD26, whilst the 150mcd/m/2lx analysis is provided to help estimate potential future performance of markings on roads causing concern and as a marker to provide information for future analysis on specification of performance materials.

The results of the 2003 survey, indicates that the previously identified year on year deterioration of the UK lining network seems to have been arrested, although overall performance still remains poorer than 2001 on all road types, with the exception of motorways, with some 25% of markings below the TD26 intervention level. Whilst the overall proportion of markings below the intervention level is still well above that reported in 2001, there are clear indications that action is starting to be taken to address the major concerns raised in the reports in 2001 and 2002.

These indications are clearest on motorways and dual carriageways with substantial improvements being recorded especially in respect to the motorways, where the overall figure is now better than that recorded in 2001. Notwithstanding these positives the single carriageway network continues to be a cause for concern as it continues to decline in the critical less than 80mcd/m2/lx category.

Detailed in Figure 4.2 to Figure 4.4 overleaf are the results broken down by road type and by individual road, thereby providing a clear indication as to where the main areas of concern appear to be.

MOTORWAY Road Surveyed	Km surveyed 2001	Km surveyed 2002	Km surveyed 2003	%age lines below 100mcd /m2lx 2001	%age lines below 100mcd /m2lx 2002	%age lines below 100mcd/ m2lx 2003	%age lines below 150mcd/ m2lx 2001	%age lines below 150mcd/ m2llx 2002	%age lines below 150mcd/ m2llx 2003	%age lines below 80mcd/ m2lx 2001	%age lines below 80mcd/ m2lx 2002	%age lines below 80mcd/ m2lx 2003
M40	72.0	68.6	68.6	55	19	10	90	57	54	29	11	0
M69	25.5	25.4	25.4	68	73	25	100	77	69	37	58	4
M62	31.7	30.1	30.1	13	38	35	78	70	86	3	18	6
M1	97.4	93.5	93.5	52	49	26	95	79	78	16	22	3
M66	16.0	13.7	13.7	19	59	70	93	84	96	4	35	30
M6	109.7	105.6	105.6	24	20	44	74	61	86	3	14	23
TOTAL / AVERAGE	352.3	336.9	336.9	39	43	35	88	67	78	15	26	11

Figure 4.2

The results obtained from the motorway sample clearly illustrate the effect of appropriate maintenance on outputs. In our report last year we identified the significant improvements on the M40 as a result of what we considered to be improved maintenance, this improvement has been sustained with this stretch of road recording the first zero rating for the proportion of markings falling into the immediate replacement category, whilst only 10% of markings will require replacement in the short term. Indeed the M40, M69, M62 and M1 samples have all recorded significant improvements over the last 12 months, with a particular improvement on the M69, a road previously the subject of specific criticism in our surveys.

It will be interesting to note whether these improvements are sustained over the next 12 months, as has been the case on the M40. The RSMA welcomes the results obtained on these motorways and commends the maintenance agents and contractors for their endeavours

The medium term decline in performance of markings on the M6, predicted in the 2001 survey and identified in the 2002 report has continued and, along with the M66, we would recommend that action is taken to halt the decline, by using both stretches for piloting the introduction of the requirements contained in TD26. With over a quarter of motorway markings on the M66 and nearly a quarter on the M6 falling below the immediate replacement threshold set out by the Highways Agency, the case for immediate and urgent remedial work is both clear and straightforward.

The results for the Dual Carriageway sample in 2002 represented the worst results of any road category analysed and whilst the overall picture for this category is one of improvement this has mostly been driven by the improvements on three roads, namely the A56, A1 and A303, all of which have recorded significant improvements over the last 12 months.

The future profile of the performance on the A56 and A303 will be of interest, as the previous results tend to indicate that there may be a need to revise the maintenance regime and timescale to ensure that they do not drop to the unacceptably low levels of performance witnessed in previous surveys. Once again we commend the actions of the maintenance agents and contractors on these two roads identified last year as requiring immediate attention.

Figure 4.3

DUAL 'A' Road Surveyed	Km surveyed 2001	Km surveyed 2002	Km surveyed 2003	%age lines below 100mcd/ m2lx 2001	%age lines below 100mcd/ m2lx 2002	%age lines below 100mcd/ m2lx 2003	%age lines below 150mcd /m2lx 2001	%age lines below 150mcd/ m2lx 2002	%age lines below 150mcd/ m2lx 2003	%age lines below 80mcd/ m2lx 2001	%age lines below 80mcd/ m2lx 2002	%age lines below 80mcd/ m2lx 2003
A45	24.8	23.6	23.6	70	96	74	99	96	80	30	76	61
A46	7.2	7.1	7.1	58	59	80	100	92	95	22	12	71
A56	13.7	13.4	13.4	73	89	30	99	93	76	30	70	15
A66	80.7	77.8	77.8	7	46	59	45	76	77	3	30	25
A1	79.4	76.5	76.5	22	36	22	74	79	36	6	30	9
A303	30.8	29.4	29.4	28	67	20	89	98	56	5	48	14
TOTAL / AVERAGE	236.6	227.8	227.8	43	66	48	84	89	70	16	44	33

The deterioration in the results from the A46 are disappointing in that they could have easily been predicted from the 2002 results and, despite the data being provided to those responsible for maintenance, there is no evidence to indicate that maintenance has been programmed to avoid the current situation where 71% of all road markings require replacement under the proposed TD26 intervention level. The marginal improvement on the A45 is tempered

by the fact that this road has been a consistently poor performer in our surveys and the 'failure' rate of marking still remains unacceptably high.

Notwithstanding the clear improvements in this category the overall results for the Dual Carriageway category still indicate that one third of markings require immediate replacement, whilst nearly a half drop below the investigatory level identified in TD26.

The sample for single carriageway roads provided the poorest results in the 2001 survey and was only saved from that placing again in 2002 by the decline in Dual Carriageway performance. With the improvements in this latter category in 2003, the single carriageway sample overall once again exposes the failings of the maintenance regime adopted primarily by local authorities. Excepted from criticism in this category is the A358, which is a consistently good performer in the RSMA survey and shares the kudos this year with the M40 of recording a zero failure rate under the TD26 intervention level.

SINGLE 'A' Road Surveyed	Km surveyed 2001	Km surveyed 2002	Km surveyed 2003	%age lines below 100mcd/ m2lx 2001	%age lines below 100mcd/ m2lx 2002	%age lines below 100mcd/ m2lx 2003	%age lines below 150mcd/ m2lx 2001	%age lines below 150mcd/ m2lx 2002	%age lines below 150mcd/ m2lx 2003	%age lines below 80mcd/ m2lx 2001	%age lines below 80 mcd/ m2lx 2002	%age lines below 80 mcd/ m2lx 2003
A59	18.6	17.7	17.7	43	78	89	99	97	57	8	55	76
A161	46.2	38.2	38.1	44	74	79	87	67	75	16	59	63
A352	18.6	18.4	18.4	56	86	55	91	86	67	18	70	44
A356	23.2	22.7	22.7	57	79	68	93	88	86	21	57	50
A358	14.1	13.5	13.5	53	22	16	91	60	52	11	8	0
A359	24.9	23.8	23.8	38	45	39	97	91	83	11	18	17
A361	23.6	22.4	22.4	39	46	44	80	85	77	14	27	18
A373	16.8	23.8	16.0	53	35	72	91	75	78	23	28	66
TOTAL / AVERAGE	**186.3**	**172.7**	**172.6**	**48**	**58**	**58**	**91**	**81**	**71**	**15**	**40**	**42**

Figure 4.4

In the remainder of the sample with the exception of the A359 and A361, which record adequate results, the overall picture is a cause for great concern and no more so on the A59 where an incredible 76% of markings are identified as requiring immediate replacement. Once again this concern is compounded by the fact that the maintenance agents for this road were provided with all previous data that indicated an already poor situation and this in our opinion should have triggered immediate action.

With the exceptions of the roads identified above this survey indicates that for single carriageway roads the case for a more rigorous approach to road marking maintenance beyond a mere cyclical approach is well made and that whilst all those responsible for maintenance should consider this point, it is those predominately (but not exclusively) those responsible for the non-trunk network that need to identify their response.

SECTION 5: CONCLUSIONS

Whilst the results of the 2002 Survey made depressing reading, we believe that in certain areas the 2003 survey indicates actual and potential improvement. In the last 12 months the RSMA and Highways Agency have worked closely on reviewing the 2001 and 2002 data, the details being circulated to HA Agents. The results of the 2003 survey tend to indicate that there has been a positive response from at least some of those agents and this is reflected in the significant improvements in the results on the motorway network and the improvements in the results for the majority of dual carriageways.

Even in those circumstances where either agents and/or local authorities have failed to respond to the data it is possible to draw some 'satisfaction' in that the continued deterioration on some roads has re-inforced the predictions made in 2001 and 2002 and clearly identify the way in which annual condition reports for road markings can be used to develop predictive maintenance. This is particularly true, although not demonstrable in a brief report such as this, for smaller sub-sections of some roads measured where overall strong performance masks particular areas where problems are developing and responsive solutions are required rather than blanket specifications.

The major areas for concern are two fold and relate to the continuing poor performance of the single carriageway network, where there is evidence of both the continued use of outdated standards and the continued use of inflexible standard maintenance contracts that are neither monitored nor suitable for purpose. These areas for concern reflect the major resource issues faced by all road-marking specifiers whether Highways Agency or Local Authority, in that significant investment is required to bring specifications and road markings up to an acceptable standard, investment that needs to be identified and programmed into an implementation plan for TD26.