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Health and Safety Executive

Evaluation of the mechanical condition of agricultural vehicles

Prepared by **BAGMA**
for the Health and Safety Executive 2007

RR554
Research Report

HSE

Health and Safety Executive

Evaluation of the mechanical condition of agricultural vehicles

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An investigation was undertaken to establish a baseline assessment of the mechanical condition of agricultural vehicles in use on farms in Great Britain.

A detailed examination of 242 tractors and 71 agricultural trailed appliances was carried out to meet the requirements of an inspection according to regulation 6 of The Provision and Use of Work Equipment Regulations 1998 (PUWER 98). Trained agricultural engineers carried out the examinations and the results analysed to provide information on the scale and nature of defects found according to vehicle age, region, horsepower and main farm activity.

There are currently no figures, statistics or information on the mechanical state of agricultural tractors and trailers in the UK that enable evaluation of the impact of interventions and the effective direction of policy for Department of Transport (DfT), the Health and Safety Executive (HSE) and other interested bodies (eg insurers).

This report and the work it describes were funded by the Health and Safety Executive (HSE). Its contents, including any opinions and/or conclusions expressed, are those of the authors alone and do not necessarily reflect HSE policy.

HSE Books

First published 2007

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EXECUTIVE SUMMARY

This work was carried out to provide a meaningful sample of data on the mechanical condition of agricultural vehicles currently in use. Thorough inspections of 242 tractors and 71 trailed appliances were carried out by trained examiners according to a standardised procedure and reporting format. Only 35 tractors were found without any significant mechanical faults.

Roadworthiness of tractors, according to current highway legislation, was one of the factors that the analysis of results highlighted and it was found that 166 (68.6%) tractors and 40 (56.3%) of the trailed appliances inspected do not meet road requirements.

The inspections were carried out between April 2006 and November 2006 from a range of farms selected by the dealers and information was collected to enable analysis by region, age of tractor, horsepower and farm type.

Visibility items such as windscreens, wipers and rear view external mirrors (wing mirrors) were among the commonest faults and there were significant numbers of faults on specific safety items such as trailer hitches and PTO guards. A large number of faults were also identified, such as tyre pressures, that could be cheaply remedied and improve tyre wear, fuel efficiency and safety both on and off road.

The number of tractors and trailed appliances examined by dealers was disappointing with some regions not being covered at all. With the funding available dealers would not have been financially compromised between regular work and the research work. The extra forms may have altered the detailed results, but not the general overview of the report, as the numbers were sufficient to give a viable analysis.

Feedback from customers who had their vehicles examined was mixed. Some thought it was a good idea and long over due, others thought it was more regulation and pressure on farmers and others had an issue if it were kept within the dealer trade. The most rewarding feedback was from farmers who wanted mechanical faults highlighting before a problem arose. With the cost of a breakdown increasing as highlighted by Blackburn (2000) farmers are wanting to do more preventative maintenance rather than reactive.

Agricultural vehicles need to be maintained more effectively. If a tractor is unsuitable to go on the road then it is also unsafe off road and may also be mechanically unsafe. More work on the farm would reduce the number of faults and failures by undertaking simple maintenance procedures although a statutory inspection scheme might be more effective.

The Farm Vehicle Health Check should be adopted and used by Insurance companies when insuring farm tractors to promote uptake of the guidance and improve maintenance. Farm assurance organisations should adopt the Farm Vehicle Health Check scheme to ensure tractors are up to the same standards as other farm processes.

This report identified some of the problems for inspection of trailed equipment due to the diverse range and noted that further work is required to develop a process to test brake performance of trailers and trailed appliances.

1 INTRODUCTION

1.1 BACKGROUND AND RATIONALE

There are currently no detailed figures, statistics or information on the mechanical state of the tractors in the UK. Using BAGMA trained PUWER Examiners, a total of 242 tractors and 71 trailers were fully inspected using the BAGMA forms to compile a statistical analysis of a sample of the tractor and trailer fleet in the UK.

Apart from lifting equipment, there is no statutory inspection regime for agricultural vehicles and trailers although regulations do exist that require vehicles used both on and off the highway to be properly maintained. Regulation 5 of the Provision and Use of Work Equipment Regulations 1998 (PUWER) and Regulation 100 of the Road Vehicles (Construction and Use) Regulations 1986 is the relevant legislation.

In a previous study by Department of Transport (1997) a small sample of tractors (32) were examined following accidents on roads. While the faults found were not necessarily the contributory factor, the report did indicate that the number of failings were high at 66%.

Figures obtained from the Vehicle and Operator Services Agency (VOSA) (shown in Appendix 6) indicate that approximately 27% of tractors examined at roadside spot checks have deficiencies warranting the service of a prohibition notice either immediately or delayed.

One of the issues addressed by this study is whether there are any major differences in the number of faults found for vehicles used predominantly off-road when analysed by different criteria.

1.2 AIMS AND OBJECTIVES

The project aimed to quantify the condition of the tractor fleet in the UK using a robust inspection process to provide data that can be extrapolated to provide a national view.

Trained examiners were used to ensure consistency of approach.

BAGMA PUWER 98 Examiners followed the BAGMA inspection procedure to provide a full report of the tractor / trailer condition. Each report was sent back to BAGMA for analysis and to provide an in-depth report once all the inspections had been carried out.

Since the research started, a full unit of certification is being developed by the National Proficiency Tests Council (NPTC) to ensure that any future inspectors have a recognised, independent certificate of competence to ensure they have the relevant skills to undertake an inspection. The VRQ Level 3 unit is called The Inspection of agricultural tractors and mobile work equipment for serviceability.

2 METHODOLOGY

2.1 GENERAL

Machinery dealers who were members of The British Agricultural and Garden Machinery Association (BAGMA) carried out the examinations. The dealers are registered PUWER Examiners who have completed the PUWER Inspection Training course. Using these trained examiners ensured a consistent approach to inspecting vehicles from across the country, therefore helping to ensure consistency of data. It was found that on a couple of items (See Appendices 1 and 2 - B2a, B2b on the left and right track analysis) the interpretation between examiners was different, however in the remainder of the inspections there was good consistency with the approach and there were very few wildly different or outstanding results.

The inspections were carried out between April 2006 and November 2006 from a range of farms selected by the dealers, not BAGMA. BAGMA asked that the dealers examine a certain number of tractors from certain year bandings.

An inspection for a tractor takes approximately 1 hour including a dynamic brake test when appropriate facilities were available on the farm. In some circumstances it was not feasible for a test to be carried out due to location, access to brake testing device or trained staff. Ideally a brake test would be associated with a full inspection in future.

242 tractors were inspected across the country.

2.2 CRITERIA FOR INSPECTION

In order to obtain a truly random sample, the vehicles examined would need to have been selected from all those available for use. This would have been extremely resource intensive and it was felt that this degree of rigour was not appropriate for this study. However, in order to gain a reasonable spread of information the following criteria was provided to each dealer for guidance in each inspection.

- 5 tractors from each of the following periods (up to 1990, 1990-1995, 1995-2000, 2000 - 2005)
- Each tractor must be 70hp or above
- All tractors must be agriculturally based
- 1 in 5 tractors should be non-road registered
- 4 tractors should be registered for on road use (V55)
- Tractors can be either 2 or 4 wheel-drive

The PUWER 98 inspection sheet was used to carry out the inspection of each tractor with additional information collected on farm activity and horsepower – details can be found in Appendix 3

A full explanation of the Inspection process is detailed in GN 100 – see Appendix 7, and the brake testing guidelines are included in that document. It was important to have standard guidelines from which testing was carried out.

3 RESULTS

The original target for the number of tractors to be inspected was 420 equally divided between dealers across the country who had trained personnel and 242 of these were completed. Dealers were free to choose which tractors they examined which may have introduced some bias. However, this could affect the results either way if, for example, the dealers chose the worst tractors or they went to their most amenable customers with regular service contracts. Informal feedback would tend to suggest that most dealers wanted to try and get a fair representation of vehicle condition so although this bias must be considered, the overall effect, particularly on issues with substantial numbers of defects will not be great.

It was disappointing that not all the inspections were completed. There were enough dealers who had the skilled staff to complete the inspections, but chose not to. Given more time the work could have been allocated to more willing dealers but this would have contributed more bias to the results.

Feedback from customers who had their vehicles examined was mixed. Some thought it was a good idea and long over due, others thought it was more regulation and pressure on farmers and others had an issue if it were kept within the dealer trade. The most rewarding feedback was from farmers who wanted mechanical faults highlighting before a problem arose. With the cost of a breakdown increasing, as highlighted by Blackburn (2003), farmers should do more preventative maintenance rather than reactive.

The current estimate for the size of the agriculture tractor fleet registered with DVLA is 257696[a] so the sample examined represents 0.01%. Whilst this is a relatively small proportion it will still be possible to extrapolate the findings to a national level by taking account of confidence intervals and bias.

The leading items where faults were found on tractors are in Table 1 and a full breakdown is provided in appendix 1. Sections 3.2 to 3.5 then show the results of the tractor examinations by region, age, horsepower and farm activity. Apart from the regional figures, the total examination results for each of these breakdowns will not necessarily add to 242 since there were some data omissions on the recording forms or information was not available.

As part of the study 71 trailed appliances were also examined and the results of these can be found in section 3.7 and Appendix 5.

3.1 OVERALL TRACTOR FAULTS FOUND

The most noticeable figure from the entire research is that out of the 242 tractors examined, 166 (68.6%) had faults, which meant they did not meet highway requirements according to the Construction and Use Regulations. The reasons for this are wide ranging, some minor and easily correctable by replacing light bulbs, others are more major items such as brake performance, tyre wear and pressures and vision through the front window. If bias, as mentioned above, is disregarded the 95% confidence interval for roadworthiness failures is +/- 5.9% so the number of failures is still very significant.

Among the highest cause of failures were driver vision items such as the windscreen wiper/washers and rear view external mirrors (wing mirrors). Table 1 lists the main faults that had a failure rate above 12% (taken from appendix 1), which have most significance. The items have been grouped according to whether they are road, safety or purely mechanical issues although it should be noted that some items might belong to more than one group and the division shown here is purely arbitrary.

[a] *Figures obtained from Department for Transport. These are vehicles registered with body type 'agricultural tractor' and this figure does not include body type 'tractor' only, SORN or unlicensed vehicles.*

Table 1 Overall tractor faults with a failure rate of 12% or above

	Item	*Ref*	*% Failure*
Road items	Front Windscreen Wipers & Washers	A1	43.8
	Brake Lights / Housing	C9	38.8
	Registration Plate Light	C12	31.8
	Wing Mirrors	A8	30.6
	Front Tyres & Pressures	B1	25.6
	Rear Tyres & Pressures	B2	23.6
	Rear Side Light	C4	22.7
	Function of Lights	C7	21.9
	Headlights Dip / Main Beam	C2	19.8
	7 Pin Connector	C13	19
	Rear Windscreen Wipers & Washers	A3	18.2
	Front Side Lights	C3	18.2
	Horn	C15	14.9
	Rear Indicators	C6	13.2
	Handbrake Function & Cable	B12	12
	Hazards	C8	12.8
Safety items	Trailer Hook Wear & Lock	E12	17.8
	PTO Guard	E17	14.9
	Seat Fixings / Adjustment	D2	12
	Doors	A6	11.6
	Clevis Hitch Wear & Lock	E13	12
Mechanical items	Check Chain Wear	E19	15.7
	Rear Work Light	C11	19.4
	Front Work Light	C10	12.4
	Mechanical Couplings	B17	12.8
	Battery Fixing	E16	13.2
	Operators Manual	E26A	34.3
	Oil Leaks / Water Leaks	E20	22.7
	Rear Lift Linkage Assembly / Lift Arms	E13b	11.2
	King Pins / Grease Point	B10	10.7
	Overall roadworthiness		68.6

3.2 ANALYSIS OF TRACTOR FAULTS BY REGION

The survey was split into 7 regions and details of the counties covered by each region are in Appendix 3. The Welsh region wasn't covered because of changes in circumstance in the dealership undertaking the research project. The overall results by region are shown in Table 2.

Comparison between regions needs to be treated with caution due to the variance in numbers of examinations carried out and farm type selected (see Table 4) which may be due to dealer bias.

Table 2 Breakdown by region

Region	No. examined	No. failed	% failure rate
Scotland	45	34	76
North	42	17	40
East	15	7	47
Midlands	60	43	72
South East	59	47	80
South West	21	18	86
Totals	242	166	68.6

The figures in Table 3 show the highest 20 items by failure rate broken down into regions. For most items there is considerable variation in failure rate between regions. Both Scotland and the South East have high

failure rates for many items when compared with the South West that has a similar overall failure rate. This tends to suggest that multiple failures are more common in Scotland and South East than elsewhere.

Table 3 Summary of failures according to region of the country

		% of failures by region					
	Fault area	*North*	*East*	*Scotland*	*Midlands*	*South east*	*South west*
Road items	Front windscreen wipers & washers	28.6	33.3	55.6	48.3	45.8	38.1
	Rear windscreen wipers & washers	14.3	6.7	20	25	22	0
	Headlights dip / main beam	19	6.7	20	28.3	18.6	9.5
	Front side lights	19	6.7	22.2	15	23.7	9.5
	Rear side lights	26.2	13.3	26.7	20	28.8	4.8
	Rear indicators	16.7	13.3	8.9	6.7	23.7	4.8
	Function of lights	16.7	26.7	46.7	15	15.3	14.3
	Hazards	11.9	13.3	13.3	11.7	16.9	4.8
	Brake lights / housing	33.3	26.7	37.8	41.7	49.2	23.8
	Rear work light	11.9	13.3	26.7	21.7	18.6	19
	Registration plate light	28.6	26.7	20	38.3	37.3	33.3
	Horn	16.7		22.2	13.3	10.2	19
Safety items	PTO guard	9.5	13.3	24.4	16.7	13.6	4.8
	Seat fixings	11.9	6.7	31.1	5	5.1	14.3
	Trailer hook wear & lock	14.3	13.3	24.4	23.3	11.9	14.3
	Clevis hitch wear & lock	2.4	6.7	20	13.3	13.6	9.5
Mechanical items	Battery fixing	7.1	6.7	20	16.7	10.2	14.3
	Check chain wear	14.3	13.3	31.1	13.3	6.8	19
	Oil leaks / water leaks	14.3	26.7	37.8	3.3	32.2	33.3
	Operators manual	35.7	26.7	42.2	30	27.1`	52.4
	Road worthiness	40	47	76	72	80	86

The figures in Table 4 are provided for illustration and show the farm type against region for tractors inspected and broadly follows what could be expected from the traditional distribution of farm types.

Table 4 Breakdown of total numbers inspected by business type in regional bandings

	Arable	Dairy	Mixed	Horticulture	Not recorded	Totals
North	12	6	23	0	1	42
East	5	0	2	0	8	15
Scotland	8	5	29	2	1	45
Midlands	27	12	18	2	1	60
South East	20	4	33	1	1	59
South West	1	15	5	0	0	21
Totals	73	42	110	5	12	242

3.3 ANALYSIS OF TRACTOR FAULTS BY YEAR GROUPING

The age of the tractor was established at the inspection and for the purposes of analysis four year groups were selected: up to 1990, 1991 – 1995, 1996 – 2000 and 2000+. Tractors were selected in each of these groups for examination, the overall results are shown in Table 5.

Table 5 Breakdown by year

Year vehicle registered	No. examined	No. failed	% failure rate
Up to 1990	54	50	93
1991 – 1995	45	36	80
1996 – 2000	67	37	55
2001 +	72	26	36
Not recorded	4	na	na
Totals	242	149	62

The failure rate of the oldest tractors was very high at 93% and the youngest group, with a failure rate of 36%, raises questions about the robustness of maintenance regimes from first use.

Table 6 shows the most common failures according to year grouping.

Table 6 Summary of failures according to year grouping

		Year group % failures			
	Fault area	up to 1990	1991 – 1995	1996 – 2000	2000+
Road issues	Front wind screen wipers & washers	74.1	51.1	49.3	13.4
	Front tyres & pressures	40.7	24.4	22.4	19.5
	Rear tyres & pressures	29.6	33.3	19.4	17.1
	Wheel bearings	16.7	13.	4.5	2.4
	Handbrake function & control	16.7	15.6	9	8.5
	Handbrake & handbrake cable	16.7	15.6	9	8.5
	Headlights dip / main beam	40.7	28.9	14.9	7.3
	Brake lights / housing	74.1	44.4	32.8	13.4
	Rear side light	51.9	22.2	22.4	4.9
	Function of lights	46.3	31.1	16.4	6.1
Safety issues	Steering mounting faults	11.1	13.3	10.4	1.2
	Wheel rims / fixing	18.5	13.3	3	1.2
	PTO Guards	25.9	13.3	17.9	9.8
	Trailer hook wear & lock	38.9	20	11.9	8.5
	Clevis hitch wear & lock	25.9	15.6	9	3.7
	Rear linkage assembly	24.1	11.1	3	8.5
	Seat fixings	24.1	15.6	9	3.7
	Operation of interlocks & controls	18.5	6.7	4.5	2.4
	CAB/ROPS	14.8	2.2	1.5	0
Mechanical issues	King pins / grease point	18.5	20	4.5	3.7
	Battery fixings	22.2	20	16.4	0
	Air filters	16.6	13.3	7.5	2.4
	Radiator levels	11.1	4.4	6	3.7
	Oil and water leaks	48.1	22.2	16.4	9.8
	Exhaust & brackets	20.4	4.4	9	2.4
	Cab filter	14.8	15.6	6	6.1
	Operators manual	75.9	44.4	25.4	8.5
	Check chain wear	25.9	13.3	14.9	11
	Road worthiness	93	80	55	36

Tyre and pressure faults showed less variation across year grouping with a high number recorded for the youngest group. Most of the items show a progressive increase in failure rate with increasing age. However, tyres and power take-off (PTO) guards show less variation across the age ranges.

The highest number of faults in the up to 1990 group were found to be windscreen wipers/washers and brake lights (74.5% and 70.2% respectively) with both items scoring 13.4% in the 2000+ group. Safety items such as handbrake function and PTO guards did not show the same rate of increase across the age groups (8.5% and 9.8% to 17% and 17% respectively).

Substantial numbers of faults were found in the trailer hitch items particularly on the older tractors. This not only increases the risk of trailer detachment during transport but exposes the driver to considerable risk during tipping. This is when significant weight transfer occurs and the trailer drawbar can be forced upwards and forwards through the rear of the cab.

Table 7 illustrates the breakdown of total numbers inspected by region and yearly bandings and indicates a generally good spread of examinations across all ages from all regions.

Table 7 Breakdown of total number of vehicles inspected by region and year bandings

Year vehicle registered	North	East	Scotland	Midlands	South East	South West	Totals
up to 1990	9	4	9	13	16	3	54
1991 - 1995	10	0	8	11	13	3	45
1996 - 2000	7	4	12	20	17	7	67
2000+	15	7	15	15	12	8	72
Not recorded	1		1	1	1		4
Totals	42	15	46	61	61	23	242

242 Tractors were inspected in total. The above data is incomplete due to a variety of reasons e.g. the dealers did not record the information or the registration/serial number plate was not available.

3.4 ANALYSIS OF TRACTOR FAULTS BY HORSEPOWER

Information was gathered to enable the data to be split into 4 groups depending on horsepower (Hp) of the tractor: 70 – 100Hp, 101-150Hp, 151-200Hp and 200Hp+

The overall results are in table 8. The sample of 200+ HP tractors was so small that the results have been disregarded in the following analysis in Table 9.

Table 8 Breakdown by horsepower

Hp	No. examined	No. failed	% failure rate
70 – 100	111	87	78
101 – 150	90	59	66
151 – 200	30	15	50
200+	8	5	63
Not recorded	3	na	na
Totals	242	166	69

Again the faults found were spread across all bands, but lower horsepower groups had a higher failure rate through all areas apart from PTO guards. The lower the horsepower of the tractor more faults are found. The faults found are similar in detail compared to the analysis by their age and the most significant are summarised in Table 9.

Table 9 Summary of failures according to tractor horsepower

		Hp banding % failures		
	Fault area	70 – 100	101-150	151-200
Road issues	Front windscreen wipers	54.1	38.9	20
	Wing mirrors	42.3	25.6	13.3
	Front tyres & pressures	32.4	26.7	6.7
	Rear tyres & pressures	27	25.6	10
	Wheel bearings	13.5	4.4	0
	Handbrake & handbrake cable	12.6	13.3	3.3
	Headlights dip / main beam	28.8	15.6	0
	Front side lights	25.2	12.2	16.7
	Rear side lights	36.9	12.2	10
	Function of lights	30.6	18.9	6.7
	Brake lights / housing	49.5	28.9	26.7
	Registration light	42.3	22.2	30
	Horn	18.9	12.2	6.7
Safety issues	Wheel rim / Fixings	10.8	5.6	6.7
	Seat fixings	15.3	12.2	3.3
	Trailer hook wear & lock	20.7	16.7	13.3
	Clevis hitch wear & lock	18	7.8	3.3
	PTO Guards	17.1	13.3	16.7
	Battery fixings	18.9	8.9	10
	Rear linkage assembly	9.9	16.7	3.3
	King pins / grease point	12.6	11.1	6.7
Mechanical issues	Mechanical coupling	17.1	11.1	6.7
	Air filters	9.9	8.9	10
	Oil and water leaks	30.6	18.9	13.3
	Operators manual	54.1	22.2	10
	Check chain wear	19.8	14.4	10
	Road worthiness	78	66	50

Table 10 shows a breakdown of total numbers inspected by region in horsepower groupings.

Table 10 Breakdown of total numbers inspected by region in horsepower bandings

Hp	North	East	Scotland	Midlands	South east	South west	Total
70-100	14	5	22	35	25	10	111
101-150	13	7	19	18	22	11	90
151-200	11	3	3	5	8	0	30
200+	2	0	0	2	4	0	8
Not recorded	2		1				3
Totals	40	15	44	60	59	21	242

A total of 242 tractors were inspected however data on Horsepower was not always completed by the examiner – 3 were left not recorded.

3.5 ANALYSIS OF TRACTOR FAULTS BY MAIN FARM ACTIVITY

One of the supplementary questions asked at the inspection queried the farm type the tractor was used on. This was done to identify if there are differences in terms of vehicle maintenance between various sectors. Four areas of activity were analysed; arable, horticulture, dairy and mixed. On a percentage-by-percentage basis fewer faults were found on arable tractors compared to both mixed and dairy farm tractors as shown in Table 11.

Table 11 Breakdown by activity

Activity	No. examined	No. failed	% failure rate
Arable	73	46	63
Horticulture	5	4	80
Dairy	42	35	83
Mixed	110	77	70
Not recorded	12	Na	na
Totals	242	162	70

Dairy farm tractors had a higher percentage of faults compared to vehicles used on mixed farms. The results are summarised in Table 12. Horticulture represented such a small proportion of results that they have been omitted in this analysis.

Table 12 Summary of failures according to farm activity

		Farm type % failures		
	Fault area	Arable	Dairy	Mixed
Road issues	Front windscreen wipers and washers	30.4	52.4	46.4
	Wing mirrors	17.8	35.7	39.1
	Front tyres and pressures	20.5	47.5	21.8
	Rear tyres and pressures	16.4	50.0	20.0
	Handbrake & handbrake cable	5.5	4.8	19.1
	Headlights dip / main beam	16.4	23.8	23.6
	Front side lights	19.2	21.4	18.2
	Rear side lights	16.4	31.0	25.5
	Function of lights	15.1	23.8	25.5
	Brake lights / housing	37	47.6	38.2
	Registration light	28.8	42.9	32.7
	Horn	9.6	19	18.2
	Wheel bearings	4.1	14.3	8.2
Safety issues	Door function	6.8	16.7	13.6
	PTO Guards	15.1	11.9	12.7
	Trailer hook wear & lock	15.1	21.4	19.1
	Clevis hitch wear & lock	8.2	9.5	15.5
	Rear linkage assembly	8.2	4.8	15.5
	Seat fixings	6.8	9.5	17.3
	King pins / grease point	5.5	14.3	12.7
Mechanical issues	Mechanical couplings	6.8	19.0	16.4
	Battery fixings	15.1	11.9	12.7
	Air filters	6.8	4.8	13.6
	Oil and water leaks	12.3	33.3	27.3
	Operators manual	27.4	50	34.5
	Front axle pins	2.7	16.7	7.3
	King pins/grease points	5.5	14.3	12.7
	Check chain wear	9.6	26.2	16.4
	Road worthiness	63	83	70

Fewer tractors on dairy farms had PTO guard faults than arable or mixed. The reasons for this cannot be identified in this study. One possible explanation might be the number of implement changes that occur. On a dairy farm, for example, an implement may remain attached for some time. Conversely on arable farms frequent changes of implements might lead to more PTO guard damage.

Tyre and pressure faults are much higher on dairy tractors. The reports did distinguish between tyre wear/damage and simple pressure inaccuracy. Handbrake faults were most prominent on mixed farms at 19.1% and almost 4 times the rate found on arable or dairy farms.

Table 13 shows the total numbers inspected by farm type and age of vehicle. This shows some bias towards younger tractors on arable farms.

Table 13 Breakdown of total numbers inspected by business type and year bandings

Year vehicle registered	Arable	Dairy	Mixed	Horticulture	Not recorded	Total
up to 1990	7	14	31	0	2	54
1991 - 1995	14	9	20	2	0	45
1996 - 2000	26	14	23	1	3	67
2000+	25	5	33	2	7	72
Not recorded	1		3			4
Total	73	42	110	5	12	242

Table 14 shows a summary of total numbers inspected by farm type and horsepower. This shows some bias towards higher horsepower tractors on arable farms.

Table 14 Breakdown of total numbers inspected by farm type in horsepower bandings

Hp	Arable	Dairy	Mixed	Horticulture	Not recorded	Totals
70-100	22	30	49	5	5	111
101-150	34	12	38	0	6	90
151-200	10	0	20	0	0	30
200+	5	0	0	0	3	8
Not recorded					3	3
Totals	71	42	107	5	17	242

A total of 242 tractors were inspected and therefore the incomplete data in Tables 11 and 12 is due to the Examiners not recording the information on the examination sheet.

3.6 SUITABLILITY FOR ON ROAD vs. OFF ROAD USE

During the research inspectors were asked to record whether the vehicle was suitable for on road use and whether it was suitable for use in work and Table 15 shows the comparison between each criteria. The majority is that if a vehicle is unsafe then it is unsuitable for both on road and off road use.

Table 15 Suitability of tractor for on road v off road use

No faults have been detected	The named equipment meets highway requirements	35
Faults have been detected and the above actions are required within the time limits specified	The named equipment meets highway requirements	41
Faults have been detected and the above actions are required within the time limits specified	The named equipment does not meet highway requirements	125
The equipment must not be used until the above recommendations are carried out	The named equipment does not meet highway requirements	41
	TOTAL	242

Table 15 shows the results for the outcomes for each piece of equipment thoroughly inspected under guidance of PUWER 98 and Construction and Use Regulations 1986.

This shows that overall 207 out of 242 (85.5) tractors examined had faults identified and 166 (68.6%) did not meet highway requirements

3.7 BRAKE TESTING RESULTS

Using the Turnkey brake testing device a series of brake tests were carried out on 87% of the vehicles.
The brake efficiency (percentage) according to the Construction and Use Regulations require that brake efficiency should be at least 25%. The survey produced the results in Table 15. The full results of the brake tests are in Appendix 3.

Table 16 - Summary of brake efficiency percentages

Brake efficiency %	% of total
0 - 25	4.7
26 – 35	26.5
36 +	68.7

Since the initial research further work has been undertaken by BAGMA with a leading manufacturer and Turnkey Instruments (BAGMA and Turnkey Instruments 2006). The results are available from BAGMA, the results undertaken in this research compare favourably with the more detailed research.

The majority of tractors tested would meet minimum legal requirements for the road although it should be noted that these test results are for tractors only and do not take account of the effect of an unbraked trailed or mounted appliance.

3.8 TRAILED APPLIANCE TESTING RESULTS

As part of the research trailed appliances were also examined. Table 17 shows the results as they apply to roadworthiness. From this it can be seen that the examiners recorded that just over 56% were not roadworthy.

Table 17 Trailed appliances suitable for highway use

	Number	Percentage
Suitable for highway use	24	33.8%
Not suitable for highway use	40	56.3%
Not applicable	7	9.9%
Total	71	100.0%

The top 20 faulty items can be found in Table18. A full set of results can be found in Appendix 5.

Trailer brakes were not tested using the brake testing device as a result of the difficulties in testing brake performance at the time of the research.

A wide range of trailed appliances were inspected, this led to a small number of individual appliances being examined. They ranged from trailers to manure spreaders and large rakes which had wheels and lights.

The highest failure rate was for hydraulic hoses. The data does not distinguish between brake system pipes and other functions. Most tractor hydraulic systems operate at between 100 and 200 Bar so catastrophic failure is a distinct possibility with a damaged hose, the results of which can only be surmised.

Table 18 Trailed appliance failures by percentage

Item	ref	% failure	actual number
Hydraulic Hoses	D1	31	22
N/S Brake light	C5	27	19
Tyre Condition / Pressure - O/S	A2	25	18
Tyre Condition / Pressure - N/S	A1	24	17
N/S Side light	C3	24	17
Left Indicator	C6	24	17
O/S Brake light	C4	23	16
Indicator Fixings	C9	23	16
Hydraulic Lift Rams	D2	21	15
Hazard Warning Lights	C12	17	12
Brake Linkage/Cables	E7	17	12
Wheel Bearings - N/S	A3	15	11
Number Plate Light	C13	15	11
Draw Bar Ring	B4	14	10
Right Indicator	C7	14	10
Brake Hydraulic Hoses	E6	14	10
Cable Mountings	E8	14	10
Wheel Bearings - O/S	A4	13	9
Brake Connectors	E4	13	9
Cabling/7 PIN Connectors	C11	11	8

A more focused approach to testing trailers may need to be undertaken in future to assess the trailers in more detail rather than making it so broad. Items such as manure spreaders, fertiliser spreaders, sprayers and wheeled cultivation equipment may show signs of not being road worthy and have poor brake efficiency but may not be in a position to be inspected using traditional methods. Only a visual inspection would be able to be carried out.

4 CONCLUSIONS

A substantial proportion of the tractor fleet does not meet legal requirements for highway use due to poor maintenance and lack of repair. There are issues relating to safety critical items, which should always be maintained to a high standard. In addition there were a number of faults detected of a purely mechanical nature that contribute to increased running costs and inefficiency.

If a tractor is unsafe, then it is unsafe for both on road and off road activities.

In the absence of a statutory inspection regime the industry could do more to improve the roadworthiness and safety of tractors by making use of the *Farm vehicle health check scheme – code of practice* (BAGMA 2005) to provide a structured and systematic maintenance programme.

Mechanical and road safety issues for owners of vehicles, which are not safe to be used either on road or off road, have been highlighted throughout this report, which may well influence insurance providers in establishing mechanisms to reduce their liability costs and benefiting owners of well maintained tractors and trailed appliances.

There were large failure rates in items such as windscreen wipers and wing mirrors that are not expensive to remedy and could realise benefits from reduction in other damage caused by lack of visibility. By carrying out effective maintenance, operators would be able to identify deficiencies that, if left unchecked, may lead to further damage or inefficiency. A good example is tyre wear and pressure. Incorrect tyre pressure is an inexpensive item to remedy that will reduce tyre wear, improve fuel efficiency and make the vehicles safer to operate both on and off road.

Routine servicing of the tractors would pick up a large proportion of the faults which lead to failure; the advantage of this for the owner may well be increased sale values and reduced breakdown times. A correctly maintained tractor may well also increase the comfort and environment for the operator resulting in higher performance.

The process of inspecting tractors and trailed appliances using trained technicians was a justifiable one, however the failure of the dealer network to meet the full 420 inspections on tractors does give rise to their lack of enthusiasm to invest in any future scheme. Introduction of a mandatory scheme should rely on the qualifications of inspectors whether employed by dealers or not.

5 RECOMMENDATIONS

Agricultural vehicles need to be better maintained. Users need to ensure they have the manual and follow the recommended regular checks. This needs to be backed up by thorough inspection at regular intervals to identify faults and take remedial action. The BAGMA vehicle health check scheme provides a means to do this voluntarily but a statutory scheme is likely to be more effective.

The weight and speed restrictions for agricultural vehicles should not be relaxed unless the industry can significantly improve the maintenance and mechanical condition of its vehicles, either voluntarily or via a statutory scheme.

Insurance companies should investigate mechanisms of rewarding owners who keep well maintained vehicles to reduce their exposure to claims through tractor accidents. This approach could be mirrored and recognised by farm assurance schemes that are encouraging good practice through husbandry practices, little or no recognition is given to the machines used. The Farm Vehicle Health Scheme is an established process where this could be managed by all sectors of industry and by enforcing authorities.

The qualification and skill level of any future inspectors should be based on the NPTC Certificate of Competence to ensure a transparent approach to the inspection process by anyone wishing to undertake the inspection process.

Further work should be undertaken to determine a process to test brake performance of trailers and trailed appliances as these were harder to inspect due to the diverse range of equipment.

APPENDICES

APPENDIX 1 TRACTOR ITEM FAILURE RATE AND NUMBER IN DESCENDING ORDER

Item	Ref (see Appendix 2)	% Failure	Numbers failed
Front Windscreen Wipers & Washers	A1	43.8	106
Brake Lights / Housing	C9	38.8	94
Operators Manual	E26A	34.3	83
Registration Plate Light	C12	31.8	77
Wing Mirrors	A8	30.6	74
Front Tyres & Pressures	B1	25.6	62
Rear Tyres & Pressures	B2	23.6	57
Rear Side Light	C4	22.7	55
Oil Leaks / Water Leaks	E20	22.7	55
Function of Lights	C7	21.9	53
Security & Mounting of Controls, Function Markings	E26	21.1	51
Headlights Dip / Main Beam	C2	19.8	48
Rear Work Light	C11	19.4	47
7 Pin Connector	C13	19	46
Rear Windscreen Wipers & Washers	A3	18.2	44
Front Side Lights	C3	18.2	44
Trailer Hook Wear & Lock	E12	17.8	43
Check Chain Wear	E19	15.7	38
Horn	C15	14.9	36
PTO Guard	E17	14.9	36
Rear Indicators	C6	13.2	32
Battery Fixing	E16	13.2	32
Mechanical Couplings	B17	12.8	31
Hazards	C8	12.8	31
Front Work Light	C10	12.4	30
Handbrake Function & Cable	B12	12	29
Seat Fixings / Adjustment	D2	12	29
Clevis Hitch Wear & Lock	E13	12	29
Doors	A6	11.6	28
Rear Lift Linkage Assembly / Lift Arms	E13b	11.2	27
King Pins / Grease Point	B10	10.7	26
Flashing Beacon	C1	9.5	23
Rear Window	A4	9.1	22
Cab Filter	E9	9.1	23
Performance, parking & service brakes	B18	8.7	21
Steering Mounting	B4	8.7	29
Air Filter	E8	8.7	22
Exhaust + Brackets	E21	8.3	20
Wheel Bearings	B5	7.9	19
Front Axle Pins	B6	7.9	19
Wheel Rim / Fixing	B9	7.9	19
Footsteps	D1	7.9	19
Front Indicators	C5	7.4	18
Operation of Interlocks and controls	E27	7.4	18
Seat Belt / Anchors	D3	7	17
Fan Belt	E10	6.2	15
Radiator Level	E2	6.2	1
Hydraulic Components + (Oil / Filter)	E5	5.8	14

Item	*Ref (see Appendix 2)*	*% Failure*	*Numbers failed*
Security of all Fastenings / Chassis	D6	5.4	13
Inside Mirrors	A7	5	12
Pipe-Work & Fittings	B16	5	12
Fuel Leaks	E24	5	12
Engine + (Oil / Filter)	E7	5	12
Master Cylinder & Pipe-work	B14	4.5	11
Left Track(s)	B2b	4.5	11
Cab Mountings	D4	4.5	11
Gear Selector Linkage	E15	4.5	11
PTO On / Off Controls	E18	4.5	11
Right Track(s)	B2a	4.1	10
Cab / ROPS / FOPS	D5	4.1	10
Power Steering Unit	B15	3.7	9
Operational Test - Drive	E30	3.7	9
Rear Wheel Nuts / Studs	B8	3.3	8
Throttle Cable	E14	3.3	8
Heating System (visual check only)	E22	3.3	8
Side Windows	A5	2.9	7
Auxiliary Brake Service Pressure Test	E29	2.9	7
Radiator	E1	2.5	6
Transmission + (Oil / Filter)	E6	2.5	6
Pedal Assembly	B13	2.1	5
Front Wheel Nuts / Studs	B7	2.1	5
Fuel Tank Cap	E11	1.7	4
Front Lift Linkage Assembly / Lift Arms	E13a	1.7	4
Air Conditioning System	E23	1.7	4
Front Axle / Grease Points	B11	1.2	3
Brake Connectors / Linkage	B3	1.2	3
Front Windscreen	A2	0.8	2
Reversing Light / Alarm	C14	0.8	2
Fuel Filter	E4	0.8	2
Engine Cut Out	E25	0.4	1
Security of Prime Mover / Transmission	D7	0	0
Attachments	E28	0	0
Radiator Cap	E3	0	0
Cab Suspension	E31	0	0
Front / Rear Axle Suspension	E32	0	0

APPENDIX 2 TRACTOR INSPECTION SHEET USED BY DEALERS

REPORT OF INSPECTION (PUWER 98)

Owners Name, Location or Address for whom Inspection is made

Make:

Model:

Serial No: Reg No:

Inspection Date: Hours / Mileage:

Key:
Checked / Completed ☑
Needs Attention ☒
Adjusted
Not Applicable

Record Number:

Latest Date for next Inspection:

Vision

Item	Code
❑ Front Windscreen Wipers & Washers	A1
❑ Front Windscreen	A2
❑ Rear Windscreen Wipers & Washers	A3
❑ Rear Window	A4
❑ Side Windows	A5
❑ Doors	A6
❑ Inside Mirrors	A7
❑ Wing Mirrors	A8

Wheels / Tyres / Tracks

Item	Code
❑ Front Tyres & Pressures	B1
❑ Rear Tyres & Pressures	B2
❑ Right Track(s)	B2a
❑ Left Track(s)	B2b
❑ Brake Connectors / Linkage	B3
❑ Steering Mounting	B4
❑ Wheel Bearings	B5
❑ Front Axle Pins	B6
❑ Front Wheel Nuts / Studs	B7
❑ Rear Wheel Nuts / Studs	B8
❑ Wheel Rim / Fixing	B9
❑ King Pins / Grease Point	B10
❑ Front Axle / Grease Points	B11
❑ Handbrake Function & Cable	B12
❑ Pedal Assembly	B13
❑ Master Cylinder & Pipe-work	B14
❑ Power Steering Unit	B15
❑ Pipe-Work & Fittings	B16
❑ Mechanical Couplings	B17
❑ Performance, parking & service brakes (See attached brake performance report)	B18

Lights

Item	Code
❑ Flashing Beacon	C1
❑ Headlights Dip / Main Beam	C2
❑ Front Side Lights	C3
❑ Rear Side Light	C4
❑ Front Indicators	C5
❑ Rear Indicators	C6
❑ Function of Lights	C7
❑ Hazards	C8
❑ Brake Lights / Housing	C9
❑ Front Work Light	C10
❑ Rear Work Light	C11
❑ Registration Plate Light	C12
❑ 7 Pin Connector	C13
❑ Reversing Light / Alarm	C14
❑ Horn	C15

Superstructure

Item	Code
❑ Footsteps	D1
❑ Seat Fixings / Adjustment	D2
❑ Seat Belt / Anchors	D3
❑ Cab Mountings	D4
❑ Cab / ROPS / FOPS	D5
❑ Security of all Fastenings / Chassis	D6
❑ Security of Prime Mover / Transmission	D7

Miscellaneous

Item	Code
❑ Radiator	E1
❑ Radiator Level	E2
❑ Radiator Cap	E3
❑ Fuel Filter	E4
❑ Hydraulic Components + (Oil / Filter)	E5
❑ Transmission + (Oil / Filter)	E6
❑ Engine + (Oil / Filter)	E7
❑ Air Filter	E8
❑ Cab Filter	E9
❑ Fan Belt	E10
❑ Fuel Tank Cap	E11
❑ Trailer Hook Wear & Lock	E12
❑ Clevis Hitch Wear & Lock	E13
❑ Front Lift Linkage Assembly / Lift Arms	E13a
❑ Rear Lift Linkage Assembly / Lift Arms	E13b
❑ Throttle Cable	E14
❑ Gear Selector Linkage	E15
❑ Battery Fixing	E16
❑ PTO Guard	E17
❑ PTO On / Off Controls	E18
❑ Check Chain Wear	E19
❑ Oil Leaks / Water Leaks	E20
❑ Exhaust + Brackets	E21
❑ Heating System (visual check only)	E22
❑ Air Conditioning System (visual check only)	E23
❑ Fuel Leaks	E24
❑ Engine Cut Out	E25
❑ Security & Mounting of Controls, Function Markings	E26
❑ Operators Manual	E26a
❑ Operation of Interlocks and Controls	E27
❑ Attachments	E28
❑ Auxiliary Brake Service Pressure Test	E29
❑ Operational Test-Drive	E30
❑ Cab Suspension	E31
❑ Front / Rear Axle Suspension	E32
❑	

DEFECTS, COMMENTS / NOTES OR TESTS CARRIED OUT: Please make notes on specific defects that could become a danger to persons and a description using the relevant code(s) or any other comments to any repair, renewal or alteration required to remedy a defect found to be a danger to persons and (Actions to take / Time scales).

A brake performance test has been carried out on the named machine. The maximum legal speed for this machine on the highway is .....km/h (Construction and Use Regulations 1986).

DECLARATION BY THE COMPETENT PERSON: I hereby declare that the equipment described in this report was Thoroughly Inspected under guidance of PUWER 98 regulation and

- ❑ No faults have been detected
- ❑ Faults have been detected and the above actions are required within the time limits specified
- ❑ The equipment must not be used until the above recommendations are carried out

Please delete as appropriate
The named equipment does not meet Higway Requirements.
The named equipment meets Highway Requirements.

Authorised Examiner ID Number:
Print Name:

Signature:
Date:

Customer:
Print Name:

Signature:
Date:

Name and address of Local Dealer responsible for this inspection:

Inspection mechanism developed by BAGMA. t: 0870 205 2834 e: info@bagma.com www.bagma.com Form Ref. BAGF2 White Copy - Customer. Yellow Copy - Thorough Examiner

APPENDIX 3 REGIONAL BREAKDOWN

NORTH	Northumberland Yorkshire Cumbria Lancashire Durham
EAST	Norfolk Suffolk Cambridge Essex Hertfordshire Bedfordshire Lincolnshire
MIDLANDS	Worcestershire Warwickshire Staffordshire Leicestershire Derbyshire Nottinghamshire Shropshire Cheshire Northamptonshire Herefordshire
SOUTH EAST	East Sussex West Sussex Kent Surrey Buckinghamshire Oxfordshire Berkshire Middlesex
SOUTH WEST	Devon Cornwall Dorset Somerset Wiltshire Gloucestershire
WALES	
SCOTLAND	

APPENDIX 4 BRAKE TESTING RESULTS BY GROUPS

Horsepower		Peak Deceleration %g
Overall	high	84.6
	low	14.3
	average	45.2
70 - 100	high	67.8
	low	14.3
	average	39.1
101 - 150	high	84.6
	low	17.4
	average	49.0
151 - 200	high	76.6
	low	30.0
	average	51.1
200+	high	76.7
	low	34.1
	average	58.7

Age		Peak Deceleration %g
up to 1990	high	60.2
	low	20.9
	average	34.7
1991 - 1995	high	74.5
	low	14.3
	average	44.3
1996 - 2000	high	76.5
	low	17.4
	average	45.7
2001+	high	84.6
	low	21.7
	average	52.1

Farm activity		Peak Deceleration %g
Overall	high	84.6
	low	14.3
	average	45.2
Arable	high	78.7
	low	14.3
	average	47.4
Horticulture	high	67.3
	low	27.4
	average	44.2
Dairy	high	76.5
	low	24.3
	average	41.5
Mixed	high	84.6
	low	17.4
	average	44.2

Region		Peak Deceleration %g
North	high	76.7
	low	28.3
	average	41.8
East	high	62.2
	low	29.7
	average	44.9
Scotland	high	72.4
	low	17.4
	average	40.5
Midlands	high	76.5
	low	21.7
	average	44.6
South east	high	84.6
	low	14.3
	average	49.5
South west	high	64.2
	low	24.3
	average	51.4

APPENDIX 5 TRAILED APPLIANCE RESULTS IN ASCENDING ORDER

Item	ref	% failure	Number failed
Hydraulic Hoses	D1	30.99	22
N/S Brake light	C5	26.76	19
Tyre Condition / Pressure - O/S	A2	25.35	18
Tyre Condition / Pressure - N/S	A1	23.94	17
N/S Side light	C3	23.94	17
Left Indicator	C6	23.94	17
O/S Brake light	C4	22.54	16
Indicator Fixings	C9	22.54	16
Hydraulic Lift Rams	D2	21.13	15
Hazard Warning Lights	C12	16.90	12
Brake Linkeage/Cables	E7	16.90	12
Wheel Bearings - N/S	A3	15.49	11
Number Plate Light	C13	15.49	11
Draw Bar Ring	B4	14.08	10
Right Indicator	C7	14.08	10
Brake Hydraulic Hoses	E6	14.08	10
Cable Mountings	E8	14.08	10
Wheel Bearings - O/S	A4	12.68	9
Brake Connectors	E4	12.68	9
Cabling/7 PIN Connectors	C11	11.27	8
Parking Brake Cabling	E3	11.27	8
Function of Lights	C8	9.86	7
Tipping Brackets	D3	9.86	7
Brake Light Housing	C10	8.45	6
Depth Wheels	E19	8.45	6
Brake Hydraulic Cylinders	E5	7.04	5
Locking Device	D5	5.63	4
Blades	E14	5.63	4
Guards	E20	5.63	4
2nd Towing Hitch	E21	5.63	4
Body	B2	4.23	3
Silage Side Mountings	E9	4.23	3
Wheel Nuts	A5	2.82	2
Frame	B1	2.82	2
Draw Bar	B3	2.82	2
Sprung Axles	B6	2.82	2
Air Brake Connectors/Hoses	E1	2.82	2
7 PIN Connectors	E12	2.82	2
O/S Side light	C2	1.41	1
Tipping Door Locks	D4	1.41	1
Weight Specification Plate	E11	1.41	1
Points / Discs	E13	1.41	1
Drive Belts	E15	1.41	1
Wheel Rim Fixings	A6	0	0
Axle Grease Points	A7	0	0
Trailer Bed	B5	0	0
Flashing Beacon	C1	0	0
Parking Brake Connectors	E2	0	0
Grain Chute	E10	0	0
Hitching Points	E16	0	0

Item	ref	% failure	actual number
PTO Shaft	E17	0	0
PTO Guard	E18	0	0
Strap / Rope Fixings	E22	0	0
Load Cover Mechanism	E23	0	0
Trailer Ramps	E24	0	0
Points / Discs	E13	1.41	1
Blades	E14	5.63	4
Drive Belts	E15	1.41	1
Hitching Points	E16	0	0
PTO Shaft	E17	0	0
PTO Guard	E18	0	0
Depth Wheels	E19	8.45	6
Guards	E20	5.63	4
2nd Towing Hitch	E21	5.63	4
Strap / Rope Fixings	E22	0	0
Load Cover Mechanism	E23	0	0
Trailer Ramps	E24	0	0

APPENDIX 6 SUMMARY OF VOSA ROADSIDE CHECK RESULTS

The Vehicle Operations and Standards Agency (VOSA) undertook a series of roadside checks across the country in 2005 – Dec 2006 and the results are summarised in Table A1.

Table A1 Summary of the results of the VOSA stops in 2005 – Dec 2006

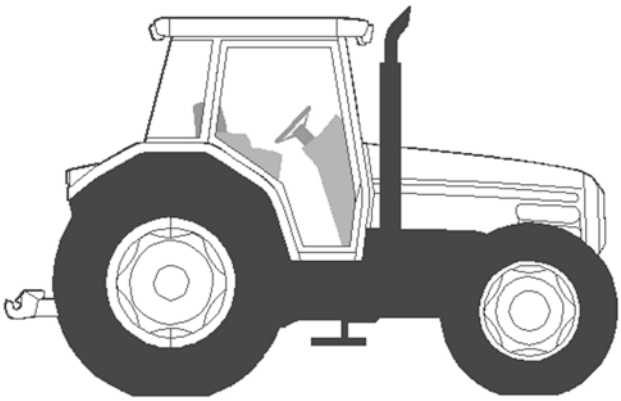
	2005/06		2006 Apr - Dec		Grand Total(%)
	Agricultural(%)	Non testable trailer(%)	Agricultural(%)	Non testable trailer(%)	
Number of vehicles checked	594	1211	530	962	3297
Immediate prohibition notices	113 (19.02)	648 (53.51)	98 (18.49)	596 (61.95)	1455 (44.13)
Delayed prohibition notices	48 (8.08)	165 (13.63)	47 (8.87)	131(13.62)	391(11.86)

It highlights that almost 60% of vehicles did not meet road worthiness requirements and just over 40% of the faults found were serious enough to warrant immediate remedial action before the vehicle could be used on the highway

APPENDIX 7 GN 100 GUIDANCE DOCUMENT USED BY EXAMINERS WHEN CARRYING OUT EXAMINATIONS

GUIDANCE NOTE

Safety Inspections of Mobile Work Equipment
BAGMA CODE OF PRACTICE GN 100-2005



Guidance Note

Safety Inspections of Mobile Work Equipment
GN 100-2005 CODE OF PRACTICE

Important Notice

PLEASE READ CAREFULLY

0. SCOPE

The purpose of this guidance note is to provide guidance on what needs to be included in schemes of thorough examination and inspection. The guidance is not intended to cover operator's routine pre-use checks or weekly checks or inspections which are part of the maintenance process.

Purpose of safety inspection

The safety inspection is intended to:

- verify that the mobile work equipment is operating as manufactures intended ;
- identify defects or weaknesses which could compromise the safe use of the mobile work equipment;
- specify the time-scales within which identified defects or weaknesses need to be rectified;
- establish that defects identified in the previous report of thorough examination / inspection have received attention;
- assess the correct function of all safety devices;
- check that warning notices are correctly fixed and legible and;
- where necessary specify any limitations on the use of the mobile work equipment.

It includes inspection or thorough examination of the mobile work equipment as well as inspection of other safety critical parts which are (covered by PUWER 98, regulation 6a).

NOTE: Where the competent person decides that they have insufficient information to allow decisions to be made on defects or weaknesses then more detailed examination and/or testing and/or more frequent time-scales for associated reports may need to be specified.

DAILY, WEEKLY, PERIODIC INSPECTIONS

This guidance note is not intended to cover the driver's routine pre-use checks or weekly checks or inspections which are part of the maintenance process.

1. LEGISLATION

Directive 95/63/EC (AUWED) amended directive 89/655/EEC – Use of Work Equipment by Workers at Work and extended its requirements, for example in relation to inspection of work equipment. These requirements are implemented in UK law by two Statutory Instruments. They are:-

SI 1998 No. 2306 Health and Safety – the Provision and Use of Work Equipment Regulations 1998 (PUWER 98)

SI 1998 No. 2307 Health and Safety – The Lifting Operations and Lifting Equipment Regulations 1998 (LOLER 98)

These Statutory Instruments are supported by Approved Codes of Practice and Guidance published by the Health and Safety Commission. They are:-

Safe use of work equipment – Provision and Use of Work Equipment Regulations 1998

Safe use of lifting equipment – Lifting Operations and Lifting Equipment Regulations 1998

The approved codes of Practice and Guidance contain the regulations, code of practice and guidance material. They are priced at £8.00 each and are available from:-

HSE Books,
PO Box 1999,
Sudbury
Suffolk
CO10 6FS

Tel: 01787 881165
Fax: 01787 313995

This legislation is addressed to those responsible directly or indirectly for work equipment and its use, and includes employers, employees, the self-employed and those who hire work equipment.

Periodic thorough examination and inspection of lifting equipment is covered by LOLER 98, regulations 9, 10 and 11. Additional requirements for inspection exist under PUWER 98, regulation 6a. The purpose of this guidance note is to provide guidance on what needs to be included in safety inspections, which includes thorough examination under LOLER 98 and inspection under PUWER 98. The guidance is not intended to cover operator's routine pre-use checks or weekly checks or inspections (covered by LOLER 98, regulation 8) or maintenance (covered by PUWER 98, regulation 5).

2. REQUIREMENTS FOR PERSONS UNDERTAKING SAFETY INSPECTIONS

2.1 Competent persons carrying out safety inspections should meet the requirements of BS EN 45004:1995; be capable of detecting defects or weaknesses for the purpose of the safety inspection; and have sufficient knowledge and experience to assess the importance of defects or weaknesses and identifying what actions need to be taken in order to rectify them.

3. FREQUENCY OF SAFETY INSPECTIONS

3.1 Safety inspections of mobile work equipment in accordance with clause 5 of this guidance note should be made at not more than 12 months intervals (but see 3.2).

3.2 In the case of any mobile work equipment with an elevating operator position for lifting personnel in a personnel work platform, the safety inspection should be made at not more than 6 months interval (LOLER 98 regulation 9).

3.3 Risk Assessment Guidance

The intervals in 3.1 and 3.2 should be decreased if a risk assessment indicates that due to intensity of use or the use environment a reduced period should be operated. Some guidance of these factors is given below. The intervals may also be extended in situations where it can be justified that less frequent safety inspection will give an equivalent level of safety.

3.3.1 12 month interval between safety inspections

Any mobile work equipment working up to 40 hours per week.

3.3.2. 6 monthly interval between safety inspections

a) Any mobile work equipment working in excess of 80 hours per week
b) Any mobile work equipment working in arduous environments such as:
   i) Marine environment
   ii) Corrosive chemical environments
   iii) Metal manufacturing or processing
   iv) Cement/aggregate processing or where abrasive particulates are present
   v) Brine Processes

4. GENERAL REQUIREMENTS TO FACILITATE SAFETY INSPECTIONS

4.1 Mobile work equipment shall preferably be cleaned prior to inspection or thorough examination.

4.2 Adequate lighting and safe working facilities must be provided.

4.3 Reasons for refusing to carry out a thorough examination include:

a) The equipment identification or rating plate is defaced or missing
b) The equipment is presented in such a dirty condition that the inspection is unreasonably difficult to undertake
c) The equipment cannot be driven correctly
d) Access to routine inspection compartments that are not accessible or cannot be readily opened
e) The condition of the equipment is such that, in the opinion of the competent person, a full inspection could cause potential injury to any person(s) or damage to the equipment
f) No operator's manual available

5. CONTENT OF SAFETY INSPECTION

The safety inspection should include items identified in sub-clauses 5.1 to 5.6. Defects or weaknesses in other items (e.g. condition of paintwork or damage to panels) need not be considered unless, in the opinion of the competent person, they are likely to imminently affect the safe use of the mobile work equipment.

The safety inspection should be carried out by the person who makes the report but assistance may be sought from site personnel as necessary to allow the competent person to discharge his/her duties effectively.

Where reference is made in sub-clauses 5.1 to 5.6 to visible components this means components, which are visible without the removal of panelling or parts but includes components which can be viewed when, for example, hinged panels or doors are opened.

5.1 Lifting Linkage and (attachments if incorporated with lifting linkage)

5.1.1 Visually inspect the attachment points for corrosion, elongated holes, loose or worn bolts and distortion and integrity of operation & any transport lock or latches.

5.1.2 Inspect the associated hoses and piping for signs of damage or potential failure, for example, as indicated by exposed braiding on flexible hoses or bulges and kinks on hoses and corrosion on pipes.

5.1.3 Load handling attachments, where fitted, should be visually inspected for distortion, cracks and security of mounting. Any hydraulic components and associated hoses and piping should be visually checked for signs of leakage or potential failure and any moveable attachments should be operated throughout their full range to ensure that they move in a controlled, even manner.

5.1.4 Hydraulic valve blocks and should be visually examined for leaks, and damage. Hydraulic cylinders should be visually examined for leakage, corrosion on the rods and alignment. Visually check end fixing for wear security and lubrication. Visually check that the seal on the pressure relief valves have not been broken and if the seals have been broken then the setting of the valves will need to be reset to the correct value using a pressure gauge and seals replaced.

5.1.5 Rigid couplings and quick release couplings should be visually checked for fretting, distortion, corrosion, damage and leakage.

5.1.6 If wear in hydraulic system components is suspected then further information on their condition can be obtained by checking the condition of hydraulic fluid or filters, particularly if debris monitoring features are included on the mobile work equipment.

5.1.7 Pick up hitch / hitch assembly should be visually inspected for distortion, wear, cracks and security of mounting and operated throughout their full range to ensure that they move in a controlled, even manner. Special attention to pick up hitch security latches and pins securing tow hitch / hook or eyelets to main assembly. Note: gap between hook & keeper on hitch assembly should not exceed 10mm.

If internal damage is suspected to hydraulic components which could affect the load holding ability of the mobile work equipment then a test will be required which should be witnessed by a competent person. The load handling parts of the mobile work equipment should be tested, under their worst case configuration, with not less than the manufactures specification of the actual capacity supported by the mobile work equipment.

5.2 BRAKING SYSTEMS

5.2.1 Visually inspect all visible hydraulic or pneumatic hoses, piping or components for leaks, corrosion and signs of potential failure.

Also check security of mountings:

- master cylinder and servo unit are checked for fluid leaks with the engine on and the brakes applied
- servo unit will be checked to ensure it is operating correctly
- visible metal or flexible brake pipes will be checked for corrosion, condition, breakages or leaks

Under vehicle checks

- flexible brake pipes and any other metal brake pipes visible beneath the vehicle are checked
- discs and drums checked for condition and contamination if applicable
- brake back plates and caliper securing devices are checked for condition and security if applicable
- condition of the brake pads will be checked if visible
- operate the handbrake and the condition of the linkages and/or cables is checked
- on some vehicles there will be a brake compensating valve, which will need to be inspected for fluid leaks

5.2.2 Visually check visible cables and linkages for damage, excessive wear, security of mounting and signs of potential failure. Carry out functional testing of the braking controls to ensure that they move freely, as expected, when the brakes are operated.

5.2.3 Check the mechanical condition of brake operating pedals and levers.

Footbrake:

- reserve travel on the footbrake so that it does not go down to the floor
- pedal rubber not worn to excess
- correct operation of the servo assistance system

Reserve brake

This could be a handbrake or a footbrake. Checked for reserve travel, so if applicable that it doesn't reach the stops on application. The mountings will be checked for security and/or corrosion.

5.2.4 Check the operational performance of all service and parking brake systems (hydraulic, pneumatic, mechanical and electrical) and that they operate as expected when applied.

Brake performance check:

The performance of the front and rear brakes and handbrake are checked for efficiency and balance using specialised equipment:

- brake should meet the minimum performance for Highway operations under The Construction and Use Regulations 1986 (Agricultural motor vehicles)
- check external hydraulic brake service port (minimum 100 Bar at engine speed 1200rpm or above, whilst service brake pedal fully depressed; note reading should be progressive as pedal is depressed)

5.3 STEERING SYSTEMS (AS APPLICABLE)

5.3.1 Visually inspect all visible mechanical components, including cables, chains, drive belts, linkages, pivot bearings/bushes on axles and ball joints for damage, excessive wear, signs of failure and corrosion. Also check security of mountings:

- security of the steering rack or steering box and its mountings
- play in steering joints
- inspection of any other swivel joints which form part of the vehicles' steering system which can be readily inspected from under the bonnet

Under vehicle checks:

- all the steering joints are inspected by the Tester whilst the steering is loaded by turning the steering wheel from side to side
- power steering systems are checked with the engine running
- the security of attachment of the steering rack or steering box is checked both with respect to the tightness of nuts and bolts, and structural cracking or corrosion of the vehicle chassis where it is attached
- turned steering from lock to lock and checked to ensure that the wheels and tyres do not foul either the structure of the vehicle or any brake pipes or hoses
- with the wheels jacked the wheel bearings are checked
- steering rack gaiters and front outer constant velocity joint boots are examined
- metal and/or rubber bushes are checked as are split pins, locking nuts and other locking or retaining devices which relate to steering components

On some mobile work equipment, there will be an element of rear wheel steering which is checked from beneath the vehicle.

With the vehicle jacked and the assistant applying different loads to the steering and suspension joints, mainly with respect to the front suspension if fitted, but also the rear, if applicable:

- wheel bearings are checked for excessive wear
- the condition of front drive shafts are checked as are the condition of CV joints if applicable

The assistant turns the wheels lock to lock to determine that there is no fouling.

5.3.2 Visually inspect all hydraulic components, including steering unit / levers, pump, cylinders and hoses for leaks, damage and signs of potential failure. Also check security of mountings.

Inside checks, Steering wheel and steering column:

- steering wheel is in acceptable condition
- steering wheel is securely attached to the steering shaft
- upper bearings of the steering column are inspected for wear
- steering shaft is checked for excessive end float
- the clamping bolts are all checked for security
- split pins and locking nuts are also checked
- 'free play' in the steering is checked
- all flexible couplings and universal joints are checked

5.3.3 Manoeuvre the Machine in a figure of eight, to check the steering response and operation, particularly at slow speed input from the steering wheel / levers or handle bars.

5.4 TRACTION SYSTEM

5.4.1 Visually inspect the prime mover and transmission for leakage of hydraulic fluid, fuel, lubrication oil or coolant, damage and signs of potential failure. Also check security of mounting. Engine covers and guards should be checked to ensure that access to trapping points is prevented in accordance with BS EN 294.

Fuel system:
Any fuel leak will result in a fail. Checked under the bonnet and throughout the run of the fuel line from the fuel tank to the engine:

- fuel filler cap must fasten securely
- the seal in the cap must not be torn, deteriorated or missing
- no other defect which could cause fuel to leak out

5.4.2 Visually inspect all visible mechanical drive components, including cables, shafts, chains, drive belts and linkages for damage, excessive wear, signs of failure and corrosion. Also check security of mountings.

5.4.3 Hydraulic valve blocks and should be visually examined for leaks, and damage. Hydraulic cylinders should be visually examined for leakage, corrosion on the rods and alignment. Visually check end fixing for wear security and lubrication. Visually check that the seal on the pressure relief valves have not been broken and if the seals have been broken then the setting of the valves will need to be reset to the correct value using a pressure gauge and seals replaced.
Check and test pressures from auxiliary trailer brake valve if fitted.

5.4.4 Visually inspect all controls, cables and linkages for correct operation, corrosion, damage and signs of potential failure. Also check security of mounting.

5.4.5 Visually inspect the condition of the exhaust system and its components to ensure they are performing to specification.

5.4.6 Inspect the condition of the battery and cell connectors and also check that associated cables are sound and have good insulation.

5.4.7 Visually inspect the tyres for specification wear, pressures, damage and bonding failure.
Note Tyre condition.

The reason for failure with respect to tyre wear is:
"The grooves of the tread pattern are not at least 1.6mm throughout a continuous band comprising: the central three-quarters of the breadth of tread around the entire outer circumference of the tyre".

Tyres must be correctly matched with regard to:

- type
- size
- structure
- where they are on the vehicle with respect to the axles

Also examined:

- general condition of tyre
- condition of valve

Tyres fail if they have serious cuts, bulges or other damage.
The wear on the tyre is checked with a tyre tread depth gauge to ensure compliance.
The tyres are examined to ensure that there is no fouling with any part of the vehicle.
Notes: Although under-inflation is not in itself a reason for failure, a brake test may be inadvisable because of possible damage, and it may affect headlamp alignment.

5.4.8 Visually inspect the wheels and their assemblies for sound condition and security of fixing.

Wheel condition:

- damage
- distortion
- cracks
- distorted bead rim
- securely attached to the vehicle
- no wheel nuts or studs missing.

An externally fitted spare wheel or spare wheel carrier must not be so insecure that it is likely to fall off.

5.4.9 Drive the machine to determine if there are any unusual noises or vibration through the range of speeds and direction reversal. Particular attention should be paid to wheel bearing condition.

5.4.10 Check PTO guards and controls and operation including PTO brake.

5.5 SAFETY SYSTEMS

5.5.1 Check for correct function of all visual and audible warning devices, e.g. horn, reversal travel alarm and control panel lights.

5.5.2 Check that all safety interlocks, if fitted, in the mobile work equipment control system are securely mounted and are functioning correctly, e.g. PTO, seat switch, starter inhibitor or micro switches on pedal or lever controls.

NOTE: Micro switches mounted through slots to facilitate adjustment, can often work loose and move out of adjustment

5.5.3 Visually inspect that electrical circuits are sound and that no components such as fuses or key switch have been obviously bridged.

5.5.4 Check operation and markings for engine start / stop controls.

5.5.5 Ensure that warning signs and other important manufacture’s instructions are present and readable Check that capacity/data plates are securely attached, legible and have/has the capacity rating for the mobile work equipment and any attachments fitted. Check also that where fitted, that information from a load capacity indicator is clearly visible to the operator.

5.5.6 Check that the function of all operation controls is identified and that such identification is securely attached and legible.

5.5.7 Check that, where fitted, road light, indicators, reflectors, screen wipers and reversing mirrors are functional.

Mirrors:

Not all mirrors on all vehicles are subject to Test, depending on the age of the vehicle. Those mirrors which must be checked must be:

- secure
- visible from the driver's seat
- not distorted or damaged so as to seriously impair the driver's view to the rear

Windscreen:
Includes all items affecting the driver's view of the road; the condition of the windscreen, the wipers and washers.
Chips or cracks in the windscreen directly in front of the driver, in the area swept by the wiper blades, are acceptable if they are less than 10mm in diameter. In the rest of the swept area, up to 40mm damage is acceptable.
Official stickers (parking permits, tax disc etc.) in the swept area in front of the driver will result in a fail if they are more than 10mm in diameter (40mm elsewhere).

Washers and wipers:
- operation
- extent of area swept by the wipers
- condition of the wiper blades

Horn:
- operation
- control can be easily reached by the driver
- loud enough
- not a sequential multi-tone

Lights:
All required lights are checked for:
- operation
- condition
- security

Side lights and headlamps:
- are the correct type and colour
- dip and aim

Stop lights, indicators and hazard lights:
- are the correct type and colour
- do not interfere with each other in operation
- driver's tell-tale works with respect to indicators, or there is an audible warning system
- must not be affected by other lamps and not be obscured
- must be red

Number plate lamps:
- all original lamps must be fitted and working

Rear reflectors:
- there must be two reflectors fitted reasonably symmetrically, securely attached and not obscured

5.5.7 Check operation of auxiliary 7 pin plug.

5.5.8 Check operators book is located on machine.

5.6 GENERAL STRUCTURE

5.6.1 Where possible visually inspect the chassis for major damage and obvious signs of cracking in welds.

Axles and Suspension; under vehicle checks:

- upper suspension joints
- any other suspension components which can be inspected from beneath the bonnet, cab and around main chassis

Applies to the front and rear suspension:

- no split pins or nuts missing, no components broken or bent
- road springs are checked for condition
- all suspension joints are checked for condition
- shock absorbers must not leak and must be secure (the vehicle will be 'bounced' by the Tester to check that they damp the springs adequately)

The suspension is checked for wear by the assistant applying loads in various ways with the wheels jacked up whilst the Tester observes the result from beneath the vehicle.

Note: There are numerous different suspension systems, and the specific nature of any examination will depend to a large extent on the design of the suspension system.

5.6.2 Visually inspect the roll-over protective structure, the overhead guard or cab for security of mounting, excessive damage and deformation, corrosion or signs of potential failures. All transparent screens must be clear and undamaged. Visually inspect all mounting bolts for security, deformation and corrosion.

5.6.3 Where possible visually inspect all fastenings securing structural members and components, e.g. fluid containers, batteries, axles and counterweights for security of mounting and damage, visually inspect the security of the seat mountings and the panels to which it is attached. Account should be taken of any corrosion.

Seat:

The seat, and any operator restraint or anti-vibration mounting, should be visually examined for damage security of seat belt mountings and locking stalks:

- security and operation of the locking/release mechanism
- condition of webbing
- retraction of the belt (it is allowed to manually feed it in)

Doors:

Both front doors must be operable from the inside and outside and all doors must latch securely.

Registration plates:

For registered vehicles the plate must be:

- present
- secure
- not faded, dirty or obscured
- be composed with correctly formed letters and spacing

6. ON CONCLUSION OF SAFETY INSPECTION

6.1.1 The competent person carrying out the safety inspection shall prepare a written report. It includes the information required under PUWER and LOLER 98.

The original of the report should then be given to the mobile work equipment users representative with a copy of the original being sent to the owner (who may be the same person).

6.1.2 Imminent serious failure of any safety critical issue associated with any part of the mobile work equipment must be reported to the appropriate authority. If the competent person carrying out the thorough examination considers that there is an imminent risk which may put the driver of the mobile work equipment or personnel working in close proximity to the machine in danger, the competent person shall immediately recommend that the machine be withdrawn from service.

6.1.3 When a mobile work equipment has successfully passed a safety inspection, the examiner shall apply a self-adhesive label indicating the following;-

a) Thoroughly examined and inspected in accordance with BAGMA Guidance Note GN 100

b) Next Safety inspection required – month/year

NOTE: The period for the next safety inspection may require reducing or increasing to compensate for usage experience. (See clause 3.3).

7. CUTTING UNITS

7.1.1 Visually inspect the cylinder unit, deck or cutter unit attachment points for corrosion, elongated holes, loose or worn bolts and distortion and integrity of operation & any transport lock or latches. Visually inspect any attachment for damage or potential failure, e.g. Glass collection box(s), brush units or grooming units.

7.1.2 Inspect the associated hoses and piping for signs of damage or potential failure, for example, as indicated by exposed braiding on flexible hoses or bulges and kinks on hoses and corrosion on pipes.

7.1.3 Inspect cylinders, rotary blades, flails, bottom blade (plate) for damage or potential failure and security. Safety guards should be visually inspected for distortion, cracks and security of mounting. Ensure that warning signs and other important manufacture's instructions are present and readable Check that capacity/data plates are securely attached, legible.
Inspect that any rollers, wheels, skids or anti-scalp units are not damaged or potential failure.

7.1.4 Hydraulic valve blocks and should be visually examined for leaks, and damage. Hydraulic cylinders should be visually examined for leakage, corrosion on the rods and alignment. Visually check end fixing for wear security and lubrication. Visually check that the seal on the pressure relief valves have not been broken and if the seals have been broken then the setting of the valves will need to be reset to the correct value using a pressure gauge and seals replaced.

7.1.5 Rigid couplings and quick release couplings should be visually checked for fretting, distortion, corrosion, damage and leakage.

7.1.6 Visually inspect all visible mechanical drive components, including cables, shafts, chains, drive belts and linkages for damage, excessive wear, signs of failure and corrosion. Also check security of mountings

8. BIBLIOGRAPHY

BS EN 45004:1995 Requirements for Persons Undertaking Thorough Examinations or Inspections

L22 HSC approved code of practice and guidance; Safe Use of Work Equipment Provision and Use of Work Equipment Regulations 1998

L113 HSC approved code of practice and guidance; Safe Use of Lifting Equipment Lifting Operations and Lifting Equipment Regulations 1998

Construction and Use Regulations 1986

Occupational Standard LBSE 27 Inspections of Agricultural Tractors and Mobile Work Equipment for Serviceability

BAGMA GN 120 -2005 A guide document for tyre Examiners

BAGMA GN 125 – 2005 Brake testing procedure

BAGMA Farm vehicle Health Check Scheme

APPENDIX 8 TRAILER APPLIANCE SHEET USED BY DEALERS FOR INSPECTIONS

Trailed Appliances Health Check

This sheet is designed for the recording of maintenance schedules on trailed equipment such as trailers, balers, sprayers, and mounted equipment such as ploughs. Due to the diverse range of equipment on the market this sheet should be used as a guide and the comments section should be used for additional items.

This check sheet is designed to help the user ensure that the relevant vehicle is correctly and safely maintained. Any items which are found to need specific rectification would normally be best dealt with by a qualified technician. Safety critical items should always be rectified by a qualified technician. The responsibility for the provision of a safe vehicle and its safe use remains with the owner or driver. The operator's manual should be with the vehicle at all times.

Owner's Name:			
Job Ref No:		Engineer's Name:	
Make:		Model:	
Serial No:		Reg No:	
Inspection Date		Hours / Mileage:	

Key	
Checked / Completed	✓
Needs Attention*	X
Not Applicable	
* Ensure notes made	
Record Number:	
Latest date for next Inspection:	

Is the vehicle under a suppliers warranty or insurance programme? Yes / No

Wheels / Tyres	Key
Tyre Condition / Pressure - N/S	A1
Tyre Condition / Pressure - O/S	A2
Wheel Bearings - N/S	A3
Wheel Bearings - O/S	A4
Wheel Nuts	A5
Wheel Rim Fixings	A6
Axle Grease Points	A7

Superstructure	Key
Frame	B1
Body	B2
Draw Bar	B3
Draw Bar Ring	B4
Trailer Bed	B5
Sprung Axles	B6
Number of Axles?	
How many Axles are braked?	
Rated Capacity of Trailer:	
Brake Drum Diameter:	mm
Brake Drum Width:	mm

Specify Trailer Type (ie. Flatbed, sided, other):

Lights	Key
Flashing Beacon	C1
O/S Side light	C2
N/S Side light	C3
O/S Brake light	C4
N/S Brake light	C5
Left Indicator	C6
Right Indicator	C7
Function of Lights	C8
Indicator Fixings	C9
Brake Light Housing	C10
Cabling/7 PIN Connectors	C11
Hazard Warning Lights	C12
Number Plate Light	C13

Tipping Systems	Key
Hydraulic Hoses	D1
Hydraulic Lift Rams	D2
Tipping Brackets	D3
Tipping Door Locks	D4
Locking Device	D5

Miscellaneous	Key
Air Brake Connectors/Hoses	E1
Parking Brake Connectors	E2
Parking Brake Cabling	E3
Brake Connectors	E4
Brake Hydraulic Cylinders	E5
Brake Hydraulic Hoses	E6
Brake Linkeage/Cables	E7
Cable Mountings	E8
Silage Side Mountings	E9
Grain Chute	E10
Weight Specification Plate	E11
7 PIN Connectors	E12
Points / Discs	E13
Blades	E14
Drive Belts	E15
Hitching Points	E16
PTO Shaft	E17
PTO Guard	E18
Depth Wheels	E19
Guards	E20
2nd Towing Hitch	E21
Strap / Rope Fixings	E22
Load Cover Mechanism	E23
Trailer Ramps	E24

Trailed Appliance Comments / Notes

Please make notes on specific items using the relevant code or any other comments on the trailed appliance (Actions to take / Time scales) (provide additional page if necessary):

Declaration by the Competent Person: I hereby declare that the equipment described in this report was Thoroughly Inspected under guidance of PUWER 98 regulation and

- ☐ No faults have been detected
- ☐ Faults have been detected and detailed actions are required within the time limits specified
- ☐ The equipment must not be used until the detailed recommendations are required

Please delete as appropriate

The named equipment does not meet Highway Requirements.

The named equipment meets Highway Requirements.

Authorised Examiner ID Number:	**Customer:**	Name and address of Local Dealer responsible for this Inspection:
Print Name:	Print Name:	
Signature:	Signature:	
Date:	Date:	

Form prepared by the British Agricultural Garden Machinery Association (BAGMA) www.bagma.com

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2 *Farm vehicle health check scheme – code of practice* BAGMA 2005 free to download at www.bagma.com

3 *GN125-2005 brake testing procedure* – BAGMA 2005

4 *Tractor accidents on rural roads* Department of Transport 1997 Greystones Publishing ISBN 1 897897 10 3

5 *Tractor, Trailers brake tests* Sept 2006 issue2.pdf BAGMA and Turnkey Instruments

Published by the Health and Safety Executive 04/07

Health and Safety Executive

Evaluation of the mechanical condition of agricultural vehicles

An investigation was undertaken to establish a baseline assessment of the mechanical condition of agricultural vehicles in use on farms in Great Britain.

A detailed examination of 242 tractors and 71 agricultural trailed appliances was carried out to meet the requirements of an inspection according to regulation 6 of The Provision and Use of Work Equipment Regulations 1998 (PUWER 98). Trained agricultural engineers carried out the examinations and the results analysed to provide information on the scale and nature of defects found according to vehicle age, region, horsepower and main farm activity.

There are currently no figures, statistics or information on the mechanical state of agricultural tractors and trailers in the UK that enable evaluation of the impact of interventions and the effective direction of policy for Department of Transport (DfT), the Health and Safety Executive (HSE) and other interested bodies (eg insurers).

This report and the work it describes were funded by the Health and Safety Executive (HSE). Its contents, including any opinions and/or conclusions expressed, are those of the authors alone and do not necessarily reflect HSE policy.

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