

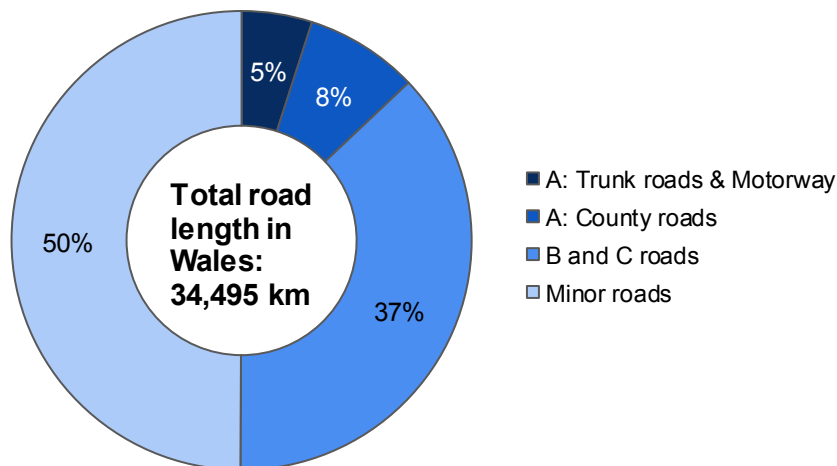
Road lengths and conditions in Wales during 2014-15

This annual Statistical Bulletin presents information about the length and condition of roads in Wales and includes data up to the financial year 2014-15. Data on the road lengths in Wales is used in the Standard Spending Assessment (SSA) calculations, which is used to distribute funding to local authorities.

Key points

- The total road length in Wales in 2014-15 was 34,495 km (*table 1*);
- Minor surfaced roads contribute approximately half the total road length in Wales (*table 1*);
- Powys covers the largest land area of the Welsh local authorities. It accounts for the highest proportion of all A Trunk roads (27 per cent), B and C roads (21 per cent) and minor surfaced roads (12 per cent), resulting in an overall 16 per cent of the total road length of Wales (*table 2*);
- The Local Authority containing the longest stretch of motorway is Newport, which accounts for 19 per cent of the total motorway in Wales (*table 2*);
- In 2014-15, 11.5 per cent of the motorway network and 12.2 per cent of the trunk road network required close monitoring of structural condition compared with 12.8 per cent and 14.3 per cent respectively in 2013-14 (*table 4*);
- During 2014-15 Powys had the highest proportion of road network in need of further investigation due to its condition, 20 per cent (*table 6*).

Chart 1: Total Road length in Wales by proportion and class, 2014-15



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Introduction

The Welsh road network, along with rail, forms the backbone of the Welsh economy. The Motorway and Trunk Roads are the main transport arteries in Wales and they carry the highest volume of traffic per kilometre. The Welsh Government is the highway authority for the motorway and the trunk road network, whilst all other public highways are the responsibility of the local authority it's within.

Road Lengths

This section deals with the road lengths within Wales for all class of roads. The Motorway and Trunk road network are the shortest at 133km and 1,576km and has remained broadly at the same level since 1997. The last increase in the motorway network occurred when the second Severn Crossing was opened during 1996-97. Their importance to the Welsh economy is illustrated by the volume of traffic. In 2014 the volume of traffic on these roads was over 10bn vehicle kilometres (3.5 billion on the motorway and nearly 7 billion on the Trunk roads)¹. Overall since 1996 the length of the Welsh road network has increased by over 400 kilometres, an increase of just over 1 per cent (*table 1*).

At a local authority level, Powys has the longest road network with 5,500km of road, followed by Carmarthenshire at 3,499km. The bulk of the networks in these two authorities are minor roads (categories B, C and minor surfaced). Newport and Monmouthshire, account for just over a third of the motorway network whilst in North Wales, Gwynedd has the largest Trunk road network at 217km (*table 2*).

The dual carriageway network makes up just over 1 per cent of the total road network and Flintshire has the greatest length at 58km. This is 11 per cent of the total dual carriageway in Wales (*table 3*);

¹ <http://gov.wales/docs/statistics/2015/151021-road-traffic-2015-en.pdf>

Table 1: Road length by road Class in Wales 1996 to 2015(a)

<i>Kilometres</i>							
	Motorway (b)	A: Trunk (excluding motorway) (c)		A: County (d)	B and C (e)	Minor surfaced (f)(g)	Total
		Total	of which: dual carriageway				
1996	126	1,582	290	2,692	12,698	16,945	34,043
1997	133	1,582	305	2,678	12,727	17,127	34,247
1998	133	1,585	305	2,685	12,769	17,195	34,366
1999	133	1,576	310	2,683	12,773	16,450	33,616
2000	133	1,575	315	2,679	12,785	16,540	33,712
2001	133	1,575	315	2,680	12,775	16,603	33,765
2002	133	1,576	344	2,711	12,774	16,631	33,825
2003	133	1,576	344	2,711	12,774	16,682	33,876
2004	133	1,578	346	2,723	12,768	16,785	33,987
2005	133	1,578	346	2,726	12,774	16,828	34,038
2006	133	1,576	346	2,736	12,767	16,857	34,070
2007	133	1,576	346	2,735	12,768	16,899	34,111
2008	133	1,577	350	2,735	12,771	16,959	34,174
2009	133	1,577	350	2,742	12,776	16,936	34,164
2010	133	1,577	350	2,738	12,797	17,038	34,283
2011	133	1,577	350	2,739	12,814	17,085	34,347
2012	133	1,576	350	2,758	12,814	17,147	34,428
2013	133	1,576	350	2,752	12,814	17,182	34,457
2014	133	1,576	350	2,752	12,813 (r)	17,186 (r)	34,460 (r)
2015	133	1,576	350	2,751	12,816	17,219	34,495

Source: Welsh Government

- (a) At 1 April of each year. Excludes trunk slip and link roads. The introduction of Geographic Information Systems in some local authorities has resulted in significant revisions to figures for some road classes in recent years. The 1999 review of the form collecting road lengths also had an effect on the 1999 figures by clarifying definitions. Figures may not match totals due to rounding.
- (b) Roads identified as M on road signs and which are reserved for use by certain types of traffic only. The A48(M) is included in this group.
- (c) Trunk roads comprise the national network of through-routes for which the National Assembly for Wales is the highway authority. The network contains all-purpose trunk roads, which are open for use by all classes of traffic, and special roads such as motorways, which are separately identified in the table. For all other public roads the local authorities are the highway authorities.
- (d) Roads of regional and urban strategic importance.
- (e) Roads which distribute traffic to urban and rural localities.
- (f) Local distributor and access roads.
- (g) New measurement techniques in Conwy have resulted in a reduction in the length of minor roads.

Table 2 Road Length by Class and local Authority 2015(a)

	<i>Kilometres</i>										
	Motorway (b)	A: Trunk (excluding motorway) (c)		A: County (d)		B and C (e)		Minor surfaced (f)		Total	
		Total	of which built-up (g)	Total	of which built-up (g)	Total	of which built-up (g)	Total	of which built-up (g)	All Roads Total	of which built-up (g)
Isle of Anglesey	0	36	2	145	28	483	59	553	176	1,218	264
Gwynedd	0	217	14	331	72	1,064	103	1,320	344	2,931	533
Conwy	0	124	19	118	52	658	113	785	405	1,685	589
Denbighshire	0	72	7	140	30	655	50	620	219	1,488	306
Flintshire	0	48	2	152	64	341	111	672	417	1,212	595
Wrexham	0	31	1	110	31	513	126	513	291	1,166	449
Powys	0	431	40	238	30	2,706	112	2,125	217	5,500	399
Ceredigion	0	114	30	158	34	1,166	100	823	123	2,261	287
Pembrokeshire	0	120	20	160	52	1,220	162	1,081	304	2,581	538
Carmarthenshire	5	147	20	248	92	1,585	234	1,515	411	3,499	757
Swansea	15	0	0	102	63	230	115	772	630	1,119	808
Neath Port Talbot	19	25	0	118	66	116	69	592	472	869	607
Bridgend	18	0	0	104	52	139	83	535	432	796	568
Vale of Glamorgan	4	0	0	74	21	369	54	590	371	1,036	446
Cardiff	17	8	0	86	52	138	96	876	865	1,124	1,013
Rhondda Cynon Taf	10	29	0	165	76	200	128	912	777	1,316	980
Merthyr Tydfil	0	37	0	28	22	47	35	222	192	333	249
Caerphilly	0	5	0	97	30	219	131	834	673	1,154	835
Blaenau Gwent	0	10	0	41	23	68	51	316	314	435	388
Torfaen	0	14	1	26	16	102	71	312	278	453	367
Monmouthshire	22	102	5	59	15	609	64	838	190	1,630	274
Newport	25	9	0	51	29	189	72	414	346	688	447
Wales	133	1,576	163	2,751	952	12,816	2,138	17,219	8,446	34,495	11,698

- (a) At 1 April 2015. Excludes trunk slip and link roads. Figures may not match totals due to rounding Source: Welsh Government
- (b) Roads identified as M on road signs and which are reserved for use by certain types of traffic only. The A48(M) is included in this group.
- (c) Trunk roads comprise the national network of through-routes for which the National Assembly for Wales is the highway authority. The network contains all-purpose trunk roads, which are open for use by all classes of traffic, and special roads such as motorways, which are separately identified in the table. For all other public roads the local authorities are the highway authorities.
- (d) Roads of regional and urban strategic importance.
- (e) Roads which distribute traffic to urban and rural localities.
- (f) Local distributor and access roads. 0.35113
- (g) Roads with a speed limit of 40 mph or less. Previously referred to as 'urban'.
Includes (h) and Motorway and A Trunk roads

Table 3: A road lengths, by road type and local authority, 2015 (a)

Kilometres

	A: Trunk (excluding motorway) (b)				A: County (c)			
	Single carriageway		Dual carriageway		Single carriageway		Dual carriageway	
	Built-up	Non	Built-up	Non	Built-up	Non	Built-up	Non
	(d)	built-up	(d)	built-up	(d)	built-up	(d)	built-up
Isle of Anglesey	2	2	0	33	28	117	0	0
Gwynedd	14	187	0	16	72	259	0	0
Conwy	19	71	0	34	44	66	9	0
Denbighshire	7	50	0	15	30	105	0	6
Flintshire	2	8	0	37	61	70	3	18
Wrexham	1	11	0	19	28	72	3	8
Powys	40	383	0	7	30	208	0	0
Ceredigion	30	83	0	0	34	124	0	0
Pembrokeshire	19	99	1	1	52	108	0	0
Carmarthenshire	20	80	1	47	92	156	0	0
Swansea	0	0	0	0	45	34	18	5
Neath Port Talbot	0	0	0	25	59	42	7	10
Bridgend	0	0	0	0	50	35	3	17
Vale of Glamorgan	0	0	0	0	21	49	1	4
Cardiff	0	2	0	7	44	8	8	25
Rhondda Cynon Taf	0	7	0	22	73	82	3	7
Merthyr Tydfil	0	17	0	19	21	5	1	0
Caerphilly	0	0	0	5	29	49	1	17
Blaenau Gwent	0	10	0	0	23	18	0	0
Torfaen	0	0	1	13	14	9	2	1
Monmouthshire	5	53	0	43	15	43	0	1
Newport	0	2	0	7	21	7	9	15
Wales	159	1,067	3	347	885	1,666	67	133

Source: Welsh Government

(a) At 1 April 2015. Excludes trunk slip and link roads. Figures may not match totals due to rounding

(b) Trunk roads comprise the national network of through-routes for which the National Assembly for Wales is the highway authority. The network contains all-purpose trunk roads, which are open for use by all classes of traffic, and special roads such as motorways, which are separately identified in the table. For all other public roads the local authorities are the highway authorities.

(c) Roads of regional and urban strategic importance.

(d) Roads with a speed limit of 40 mph or less. Previously referred to as 'urban'.

Road Conditions in Wales

Structural Condition

This section deals with the condition of the road network, which is surveyed each year to ascertain its state of repair in terms of its structural condition. Currently 12 per cent of both the motorway and trunk road network is in need of close monitoring now with a further 12 per cent of the motorway and a further 6 per cent of trunk road in need of close monitoring over the next 4 years. The majority of the network is in good condition with over a half needing close monitoring in 20 or more years.

One factor that affects the condition of the network is the volume of road traffic and in recent years this volume has increased in line with the economic recovery. In 2014, the volume of traffic on the motorway and trunk road network was 5 per cent higher than in 2010. (10.25bn kilometres in 2014 compared to 9.8bn kilometres). The volume of traffic on the motorway was 3.51bn kilometres compared with 3.26bn kilometres in 2010 (7 per cent increases)²

Table 4: Road condition: Motorway and A Trunk road network requiring close monitoring of structural condition, Wales, 2004-05 to 2014-15 (a)

Road class	Percentage of network requiring close monitoring (b)				Network surveyed (c)
	Now	In 0-4 years	In 5-19 years	In 20 or more years	
<i>Per cent</i>					
Motorway					
2005-06	6.3	5.0	20.1	68.6	100
2006-07	7.9	4.3	15.8	71.9	100
2007-08	3.3	3.3	12.2	81.2	100
2008-09	4.6	4.6	23.4	67.3	100
2009-10	4.3	3.6	18.2	73.9	100
2010-11	3.9	5.3	16.5	74.3	88
2011-12	10.0	8.0	21.9	60.1	64
2012-13	11.2	9.1	20.1	59.0	76
2013-14	12.8	13.0	19.0	55.0	69
2014-15	11.5	11.9	19.1	57.6	87
A Trunk					
2005-06	10.6	3.9	20.7	64.7	86
2006-07	11.1	4.0	20.9	64.0	88
2007-08	8.0	3.4	19.4	57.4	88
2008-09	6.2	3.7	21.7	68.4	89
2009-10	5.8	3.6	20.9	69.7	92
2010-11	5.8	6.2	21.5	66.5	70
2011-12	9.5	6.1	19.2	65.2	65
2012-13	12.8	6.1	19.0	62.0	67
2013-14	14.3	6.2	17.9	61.5	68
2014-15	12.2	6.1	18.6	63.2	93

Source: Welsh Government

- (a) Calculated using Deflectograph. The structural condition of a section of road is in need of close monitoring when it has a negative residual life. Figures are for the whole flexible network.
- (b) Percentages may not add up to 100 per cent due to rounding.
- (c) Excludes concrete pavements and elevated carriageways.

² <http://gov.wales/docs/statistics/2015/151021-road-traffic-2015-en.pdf>

Skidding Resistance

Skidding resistance relates to wet or damp road surfaces. It is a measure of the road surface condition to the resistance between the vehicle's tyres and the road when accelerating, braking or cornering. Testing takes place after the road surface has been pre-wetted, as the road surface will exhibit least friction and skid resistance when wet. Testing of dry road surfaces does take place from time to time, however it does not form any part of the routine skid resistance monitoring that takes place on the road network. It is assumed that in dry conditions all clean road surfaces have a high skidding resistance.

The skidding resistance of the M4 is of a high standard with less than 0.1 per cent surveyed found to be at or below investigatory level in 2014-15. Over the last 10 years, less than 1 per cent of the surveyed network has been found to be at or below a satisfactory level on an annual basis. For the rest of the trunk road network, below 8 per cent was found to be at or below investigatory level in 2014-15. Over the last 10 years, the proportion at or below the satisfactory level has fluctuated on an annual basis from a high of 25.2 per cent in 2005-06 to the current level.

Nearly all of lane 1 of the Motorway and Trunk Road network has been surveyed on an annual basis over the last 10 years therefore the results are considered accurate.

Table 5: Road Condition: Skidding resistance of all Trunk Roads in Wales 2004-05 to 2014-15

Road class	Lane 1 length of network (km)	Lane 1 length surveyed (km) (b)	Lane 1 percentage of length surveyed (b)	<i>Kilometres and per cent</i>
				Lane 1 percentage of length surveyed at or below investigatory level (c)
<i>Motorways</i>				
2005-06	325	325	100	0.5
2006-07	325	325	100	0.4
2007-08 (e)	364	313	86	0.1
2008-09	364	311	85	0.2
2009-10
2010-11	361	279	77	0.7
2011-12	391	302	77	0.3
2012-13	395	318	80	0.0
2013-14	395	327	83	0.1
2014-15	327	327	100	0.0
<i>All purpose trunk</i>				
2005-06	3,071	2,979	97	25.2
2006-07	3,071	2,865	93	16.7
2007-08 (e)	3,104	2,945	95	6.6
2008-09	3,104	2,972	96	9.5
2009-10
2010-11	3,108	3,108	100	8.3
2011-12	3,160	2,934	93	8.6
2012-13	3,218	3,035	94	5.5
2013-14	3,218	3,141	98	7.2
2014-15	3,243	3,193	98	7.9

Source: Welsh Government

- (a) Figures were calculated on a new basis from 2004, which affects all-purpose trunk roads more severely than motorways.
- (b) Figures relate to road lengths surveyed in the year and in the previous year (for 2006 and earlier years).
- (c) 'At or below investigatory level' does not mean the roads are unsafe; it indicates a need for further investigation to determine the need for maintenance of that section of road.
- (d) New figures for 2003 were back-calculated to provide a figure equivalent to the new standard used from 2004.
- (e) In 2007, for the first time all surveyed lengths are taken from the same year and figures are therefore truly representative of that particular year. Also, Lane 1 length of network has been updated.

Local Authority Road Conditions

Local Authorities, as the local highway authority, are responsible for County A roads, B and C roads and minor surfaced roads that they have adopted. They are responsible for nearly 33,000 kilometres of the road network.

Powys has the highest percentage of its network that are in need of further investigation (20 per cent) followed by Ceredigion (15 per cent), Wrexham (14 per cent) and Carmarthenshire (12 per cent). Care should be taken when interpreting these figures as Powys has the largest local road network in Wales (just over 5,000km), followed by Carmarthenshire (3,348km).

Table 6: Road Condition: Proportion of local authority road network in need of further investigation due to its condition

	<i>Per cent</i>	
	Percentage of Principal A, B roads and C roads in need of further investigation (a)	
	2013-14	2014-15
Isle of Anglesey	11.7	10.9
Gwynedd	9.4	9.2
Conwy	10.7	10.7
Denbighshire	9.6	8.7
Flintshire	4.3	4.5
Wrexham	16.7	13.8
Powys	20.4	19.7
Ceredigion	15.6	15.0
Pembrokeshire	12.0	9.1
Carmarthenshire	15.7	11.9
Swansea	6.7	4.8
Neath Port Talbot	6.7	5.6
Bridgend	6.9	7.8
The Vale of Glamorgan	9.9	9.9
Cardiff	6.9	6.8
Rhondda Cynon Taf	9.9	9.3
Merthyr Tydfil	7.6	5.9
Caerphilly	8.8	7.0
Blaenau Gwent	7.5	6.4
Torfaen	6.4	5.7
Monmouthshire	9.8	9.7
Newport	8.6	7.9
Wales	13.2	11.9

Source: Local Government Data Unit Wales, National Performance Indicators THS/012

(a) Based on inspection of the road surface using machine based SCANNER surveys. The figures for this indicator represent the of the road network length that is equal to or above the RED threshold; that is in poor overall condition.

Key Quality Information

Road lengths (Tables 1-3)

Most information on road lengths is submitted annually to the Welsh Government by each of the 22 Welsh local authorities. Data as at 1 April of a given year are used for the financial year that concluded on the previous day. The data are provided according to the following simplified road classification:

Motorway: Roads identified as M on road signs and which are reserved for use by certain types of traffic only. The A48(M) is included in this group. The data are provided by the Welsh Government's Network Management Division.

A: trunk roads: A trunk roads comprise the national network of strategic routes which cater for the through movement of long distance traffic for which the Welsh Government is the highway authority. The network comprises some of the all-purpose roads (A roads), which are open for use by all classes of traffic, and special roads such as motorways (which are separately identified in the tables). For all other public roads the local authorities are the highway authorities.

A: county roads: also known as *Principal classified roads*. Roads of regional and urban strategic importance.

B and C roads: also known as *Non-principal classified roads*. These distribute traffic to urban and rural localities.

Minor surfaced roads: also known as *Unclassified*. These are local distributor and access roads.

Road condition – Motorway and Trunk (Tables 4-5)

The estimates of structural road condition are derived from the National Roads Maintenance Condition Survey (NRMCS).

Deflectograph surveys: Information on the structural condition of major roads is usually collected by means of Deflectograph Surveys. A Deflectograph is an automated technique for measuring the deflection of a road surface under a standard load. Software such as DEFLEC and PANDEF have been developed to allow the structural condition of the road to be derived from the measured deflections, given certain data about the construction of the road and about the traffic loading.

Residual life: The residual life of a road is the expected period before its structure reaches an 'investigatory condition'. The point at which close monitoring of structural condition should start is defined to be when residual life falls below zero, i.e. there is a negative residual life.

Methodology

Note that the results for a year, say 2011, are not all based on Deflectograph surveys carried out in 2011 but are derived from measurements from 2000 to the end of 2011. Thus for 2011, and for every reporting year, the distribution shown represents the projected, not actual, distribution of residual life as at 1 April. For any point on the road network only the most recent survey data are used and the proportion of pre-2005 data is in fact quite small. For any point on the network for which Deflectograph survey data exist, road condition was projected forward from the date of the survey to end of the financial year of the report.

In addition data are obtained on maintenance work carried out up to the end of the financial year (March 2012 in this example). The information on maintenance allows the calculation of residual lives for the relevant road sections to take account of maintenance that has been completed or is under way. A 20-year life is assumed for a stretch of road where there has been reconstruction or an overlay of 50 mm or more unless a shorter design life was adopted (in which case the shorter life is taken). This assumed life is reduced at the rate of 1 year per calendar year until there is a new deflection survey, which allows a genuine estimate of residual life to be produced. The maintenance adjustment increases the reliability of the overall residual life distribution by moving stretches of road that have been maintained from the 'poor condition' end of the distribution, where they were correctly located before

the maintenance work was carried out, to the 'good condition' end of the distribution (The calculated residual lives before maintenance will normally have been negative or near zero).

For trunk roads and motorways, the Welsh Government has a programme of carrying out Deflectograph surveys on its eligible network over a five year cycle. Further information on the NRCMS can be found in the 'National Roads Maintenance Condition Survey: 2006' report from DfT.

A review of data processing requirements is advising a move away from DEFLEC software (used currently by Welsh Government) to incorporate the PANDEF calculation. This will make more detailed use of improved traffic information and bring Wales in line with the rest of the UK for reporting Deflectograph residual lives and treatment requirements.

Road condition – Local authority road network (Table 6)

The information is based on the performance indicator data for local authorities in Wales, compiled by the Local Government Data Unit ~ Wales, together with administrative data compiled for the management of the trunk road and principal road networks in Wales.



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