

ANALYSING THE IMPACT OF 20MPH IN WALES

Richard Owen

WEBINAR WELCOME

- The webinar will be recorded and made available via our YouTube channel.
- If you have any comments or questions you would like to be kept private please contact us directly.
- If you have direct questions that you would like a response to, please use Q&A
- Feel free to have an open discussion in Chat, although this may not be monitored by the host



WEBINAR CONTENT

- Principal focus on the research we undertook in September
- Discussion on how we evaluate and understand impacts on vehicle speeds
- Exploration of new technologies
- How do we get a better picture of journey experience
- Lessons for future schemes in the UK and other countries
- Q&A / Open Discussion

Wales 20mph Impact Analysis

Independent analysis of vehicle speeds in the first week after the implementation of 20mph speed limits in Wales



September 2023

- Independent road safety and transport data specialists
- Not paid or commissioned to carry out this research.
- Clients from public, private and third sector
- Significant experience working with vehicle GPS data and now TomTom Partners
- Also provide advice and consultancy for road safety policy, strategy and management







WHY DID WE CARRY OUT THIS RESEARCH?

- Welsh Government decision to change the default urban speed limit (restricted roads) to 20mph.
- Largest scale change in the UK
- Opportunity to see how useful new data sources are in measuring immediate impacts on speeds

WELSH STATUTORY INSTRUMENTS

2022 No. 800 (W. 177)

ROAD TRAFFIC, WALES

The Restricted Roads (20 mph Speed Limit) (Wales) Order 2022

Made	13 July 2022
Coming into force	17 September 2023

The Welsh Ministers, in exercise of the powers conferred by section 81(2) and (3) of the Road Traffic Regulation Act 1984(1), and after consultation with the Secretary of State as required by section 81(5) of that Act, make the following Order.

A draft of this Order has been approved by a resolution of Senedd Cymru in accordance with section 81(3)(aa) of the Road Traffic Regulation Act 1984.

Title, application and commencement

1.--(1) The title of this Order is the Restricted Roads (20 mph Speed Limit) (Wales) Order 2022.

(2) This Order applies in relation to Wales.

(3) This Order comes into force on 17 September 2023.

Lowering of the general speed limit for restricted roads

2.--(1) The rate of speed fixed by section 81(1) of the Road Traffic Regulation Act 1984 (general speed limit for restricted roads) is reduced to 20 miles per hour.

(2) Accordingly, the reference in section 81(1) of that Act to "30 miles per hour" is to be interpreted as a reference to "20 miles per hour".

Julie James Minister for Climate Change, one of the Welsh Ministers

13 July 2022

WHAT IMPACT DO 20MPH LIMITS HAVE ON SPEED?



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- The journey speed analysis shows that the median speed has fallen by 0.7mph in residential areas and 0.9mph in city centre areas.
- Faster drivers have reduced their speed more, with the 85th percentile speed falling by -1.1mph in residential areas and by -1.6mph in city centre areas
- The overall change in speeds is greater where speeds were faster before. The median speed fell by -1.3mph on residential roads with a before speed of more than 24mph; and by -1.1mph on 'important local roads' which typically had higher before speeds.
- On 'minor local roads' the median speed was already below 20mph and dropped by just 0.1mph.



WHAT IMPACT DO 20MPH LIMITS HAVE ON SPEED?

Assessing the Impact of 20 mph Speed Limits on Vehicle Speeds in Rural Areas: The Case of the Scottish Borders

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(This article belongs to the Special Issue Human Factors in Road Safety and Mobility)

Table 2. Descriptive statistics of mean speed and 85th percentile speed by speed band

Consid Double (mark)	Survey Wave	n	Minimum		Maximum		Average		Std. Deviation	
Speed Band (mpn)			Mean	85th Percentile	Mean	85th Percentile	Mean	85th Percentile	Mean	85th Percentile
	Survey 1 ("before")	20	14.50	18.10	20.00	26.10	18.06	22.22	1.671	2.193
0-20	Survey 2 ("after I")	20	14.20	17.30	20.50	25.30	17.41	21.36	1.781	2.252
	Survey 4 ("after III")	20	13.50	16.20	26.00	33.20	18.01	22.13	2.835	3.626
	Survey 1 ("before")	24	20.60	25.90	25.00	30.80	22.58	27.98	1.266	1.380
>20-25	Survey 2 ("after I")	24	18.40	22.90	24.10	28.80	21.01	25.78	1.231	1.429
	Survey 4 ("after III")	24	18.40	23.30	24.00	30.00	21.12	26.04	1.706	1.832
>25-30	Survey 1 ("before")	52	25.20	29.40	30.00	36.40	27.94	32.74	1.412	1.654
	Survey 2 ("after I")	52	21.10	24.10	26.90	34.10	23.71	28.60	1.293	2.131
	Survey 4 ("after III")	52	21.60	25.90	27.70	33.50	24.17	29.18	1.486	1.961
	Survey 1 ("before")	13	30.10	33.80	34.80	42.40	31.17	36.52	1.363	2.348
>30-35	Survey 2 ("after I")	13	24.30	29.10	27.60	34.10	25.87	31.83	1.131	1.772
	Survey 4 ("after III")	13	24.90	30.00	30.20	35.60	26.45	32.47	1.581	2.042

- Much more recent study in Scottish Borders
- Significant before and after data collected via automatic counters
- Much larger change in vehicles speeds
- Average reduction of 3.1 mph shortly after the introduction of the 20 mph limit
- Greater reduction of 5.4 mph was identified in locations with means speeds in the range of >30–35 mph before the 20 mph intervention
- After eight months overall mean speed was lower by 2.7 mph (approx.) compared to the mean speed before the change.

WHAT IMPACT DO 20MPH LIMITS HAVE ON SPEED?



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- Our own analysis of two small schemes in Kent in 2020 used a variety of data to understand changes in speeds postimplementation of two 20mph limits
- Speed data analysis identified reductions in vehicles speeds in both towns, Tonbridge (3mph) and Faversham (0.9mph)
- Different nature of roads and communities, or changes on higher speed roads was not considered



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WHAT DID WE PLAN TO DO?

DataMapWales



- Needed to know which roads were changing
- Maps showing roads that will remain at 30mph published by DataMap Wales
- Checked data on existing 30mph limits (inc restricted roads) validated from different sources
 - <u>www.speedmap.co.uk</u>
 - TomTom



IDENTIFY CURRENT SPEEDS

- Already use annual data for vehicle speeds in our Speed Compliance Tool
- <u>https://agilysis.co.uk/portfolio</u>
 <u>-item/speed-compliance-tool/</u>
- Doesn't allow for an assessment of immediate inyear changes





IDENTIFY CURRENT SPEEDS



- Our new data partners at TomTom provided access to their portal
- Bespoke analysis of traffic data on UK roads within 24 hours
- Up to 10 years of historic data available in minutes



IDENTIFY CURRENT SPEEDS



- Already used TomTom traffic data to model congestion in towns and cities over a 1 year period
- <u>https://agilysis.co.uk/traf</u> <u>ficinsights/</u>
- Combination of speeds, journey times and time of day analysis provides many possibilities



RESEARCH METHODOLOGY

- Couldn't analyse all roads
- Picked 10 towns and cities with a reasonable geographic distribution
- Selected roads that were going to change from 30mph to 20mph and excluded all others
- Aim to measure average speed on individual road sections and detect changes.

Town / City	Road Length Selected for
	Analysis
Cardiff	94.3km
Newport	52.3km
Swansea	78.2km
Wrexham	60.9km
Rhyl/Prestatyn	85.8km
Merthyr Tydfil	40.7km
Lampeter	10.2km
Bangor	25.1km
Haverfordwest	22.2km
Newtown	21.9km
TOTAL	491.8km
	Town / City Cardiff Newport Swansea Wrexham Rhyl/Prestatyn Merthyr Tydfil Lampeter Bangor Haverfordwest Newtown

RESEARCH METHODOLOGY

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- Mon 11th Fri 15th Sept
- Mon 18th Fri 22nd Sept
- 6am 6pm
- Sample size >=100 in both periods
- 50th percentile speed (median)
- <u>https://youtu.be/KrpY_TL-q9Q?si=TqJe5bZUN81hrdAp</u>



RESEARCH METHODOLOGY

- Ordered data on Saturday 16th & 23rd September
- Imported data into GIS software, processed and matched
- Export speed data to Excel for analysis
- Excluded low-sample roads
- Calculated a weighted average based on sample size
- Almost 60 million vehicle movements in the sample

$$WeightedSpeed = \frac{\Sigma SampleSize \cdot Distance \cdot MedianSpeed}{\Sigma Distance \cdot MedianSpeed}$$

RESULTS



Pre-implementation median speeds (weighted average) significantly lower than 30mph





RESULTS



Post-implementation speeds dropped below 20mph





LIMITATIONS



- Doesn't measure every vehicle (~20%) and no motorcycles
- Doesn't show peak speeds along a longer road section or extreme values for individual drivers
- Other percentiles e.g. 85th could be analysed too
- Speeds will be higher at night, and perhaps at weekends?
- Only a small sample of roads (419km after excluding lowsample size)
- Longer-term monitoring would provide a much richer picture of trends over time
- Includes congested traffic (not a maximum free-flow speed)

FREE FLOW SPEEDS

DfT Statistics on Vehicle Speeds -

https://www.gov.uk/government/publications/free-flow-vehiclespeed-statistics-guidance/vehicle-speed-compliance-statisticsmethodology-notes-and-definitions-background-quality-report

Free flow speeds are observed in locations where external factors which might restrict driver behaviour (for example, junctions, hills, sharp bends and speed enforcement cameras) are not present.

- Minimum vehicle headway of 2 seconds
- Can also use night-time speeds or 85th percentile



Fig. 2 - Histogram of gaps (all sites together)

https://www.researchgate.net/publication/309476899 Free-flow_vs_carfollowing_speeds_Does_the_difference_matter



FREE FLOW SPEEDS

Street Name

Speed Limit

Average Speed

Median Speed

Sample Size

Length

Standard Deviation Speed

Standard Deviation Travel Time

Percentage Congested Traffic

Percentage Free Flowing Traffic

Speed Distribution

10

North Bar Place.

Vehicle Speed

Average Free Flowing Speed

Average Congested Speed

Average Travel Time

Median Travel Time

North Bar Street

30mph

13.6mph

13.5mph

9.1mph

10:50

03:51

16:07

516,973

0.0km

22%

78%

2.7mph

16.6mph



JOURNEY EXPERIENCE

- Alternative way of looking at changes in traffic speeds
- Two sample routes (bidirectional)
- Same analysis criteria
- Measures total time travelled along multiple sections
- Compare different percentiles





JOURNEY EXPERIENCE



CONCLUSIONS

- New data sources offer an opportunity to rapidly analyse changes in speeds on a historical, or near-live basis with widespread coverage
- Drivers responded immediately with a 2.9mph reduction in the weighted average median speed on the road segments analysed
- Narrower distribution in speed values for roads in the sample area





CONCLUSIONS

- Much more opportunities available within the data to review high-speed values (85th percentiles) and roads with persistentlyhigh speeds post implementation.
- Further research possible into differences between GPS data and traditional sources including estimates of free-flow speeds
- Longer term analysis and official surveys will provide the ongoing basis for judging success alongside casualty data.







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But first....



Woburn House - London Hybrid Conference Wednesday 6th March 2024

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Q&A