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THE IDENTIFICATION OF MISTAKES IN ROAD ACCIDENT RECORDS - PART ONE: THE USE OF GEOGRAPHIC INFORMATION SYSTEMS

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CONTENTS

ABSTRACT

AUSTIN, KP (1993) The identification of mistakes in road accident records - part 1 : the use of geographic information systems, *ITS Working Paper* ***406***. Institute for Transport Studies, University of Leeds, Leeds.

The current method of checking police reported road accident data involves a rigorous process of manual and computer validation, with the objective of removing all the errors that exist on the accident report forms. This paper shows how a Geographic Information System (GIS) can be used to identify any mistakes that remain after this process has been undertaken by comparing variables on the accident report forms with accurate highway feature information obtained from other sources. The mistakes in the variables of district, speed limit, road class and road number were less than 10 per cent, less than 20 per cent for junction control, junction detail and pedestrian crossing facilities and over 20 per cent for carriageway type.

If highway data was routinely entered onto a GIS the above variables may not need to be contained on the police accident report forms, reducing the number of items collected nationally by over 2.2 million per year.

KEY-WORDS:

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THE IDENTIFICATION OF MISTAKES IN ROAD ACCIDENT RECORDS - PART 1 : THE USE OF GEOGRAPHIC INFORMATION SYSTEMS

1.INTRODUCTION

The ultimate objective of road safety engineering and education is to provide for the safe movement of people throughout the highway network. Those locations and population groups that have higher levels of accidents than the norm need to be identified. The basic source of data for this purpose comes from the police, who complete an accident report form (STATS 19) for all road traffic accidents involving personal injury that they attend or are notified of. This information is subjected to a series of manual and computer checks to identify any inaccuracies and would then be used for various safety studies.

Several investigations have been undertaken to assess the validity of accident records. Shinar et al (1983) compared the information on 124 police reports with that collected by Multi-Disciplinary Accident Investigation (MDAI) teams. They found the most inaccurate highway feature data was gradient, speed limit, surface composition and curvature. Howard et al (1979) found that controls upon the road, intersection type, traffic conditions and gradient were the most incorrectly recorded variables. Questionnaire studies of local authorities (Ibrahim and Silcock, 1992, Austin, 1993) showed the location of the accident to be the most inaccurately defined variable.

Unfortunately, these studies only concentrate on the mistakes that are made by the police which must be expected given the situations they face at the scene of a road traffic accident. These mistakes do not matter provided a validation system can identify all of them, although any that remain can have a substantial impact on safety investigation. Those accidents that are coded incorrectly will alter the total number of accidents relating to a certain feature, whilst those that are wrongly located will alter the number of accidents at certain sites, reducing the validity of site investigation studies.

The objective of this paper is to show how a Geographic Information System (GIS) can be used to identify any mistakes that remain after the validation process has been completed. A GIS is a computer program that identifies the location of an object and provides information about it enabling spatial and statistical analyses to be performed. This project used PC ARC/INFO which is the most popular GIS in British local authorities with a market share of around 22 per cent, almost double that of the next most popular package, produced by Alper Systems (Campbell,1991). The digital map used was the Ordnance Survey Centre-line Alignment of Roads (OSCAR) and covered a five kilometre square of north Hull. Between 1987 and 1991 a total of 1884 accidents occurred within this area. Certain items coded onto the accident records were compared with the same items taken from road network data so that mistakes in the coding of these items and in the locating of accidents could be identified.

2.CURRENT VALIDATION PROCEDURE

The accident data that are made available for safety studies are collected by the police. A STATS

19 record is completed for all injury accidents they attend or are notified of. This contains details of the highway features at the location and the vehicles, drivers and casualties involved in the accident. The data entry and validation process described in this section relates to the county of Humberside, although most highway authorities in the United Kingdom maintain a similar system.

The STATS 19 records are transferred to the police processing authority who transcribe the information onto a computer database. Whilst they are doing this they manually check the records for any mistakes. These records are then validated using a computer program (STATS 21) which checks the consistency of the data. For example, if the carriageway type variable is coded as a roundabout then the junction detail variable must be coded either as a roundabout or a mini-roundabout, otherwise the record is flagged as being inconsistent and would be manually corrected.

The data are sent to the highway authority who plot the accident onto a paper map and code its grid reference onto the computer. The grid reference refers to the bottom left hand corner of the 10 metre square within which the accident occurred and so if an accident was located in the top right corner its stated co-ordinates would be 14.1 metres from the correct position. Each STATS 19 record is again manually checked and any mistakes corrected. The STATS 21 program is rerun to check the variables that have been altered and the data are sent to the Department of Transport who compile the national accident statistics (Department of Transport, 1992).

It is inevitable that mistakes will be made because the police have many duties to perform at the scene of an accident. Those accidents that are notified to the police by an involved party are also likely to have mistakes because most individuals are not trained to collect this information. The existence of these mistakes are not important provided a system is available which can identify them. The following section explains an improved system which quantifies the number of mistakes remaining for certain items after the current validation procedure has been undertaken.

3.DEVELOPMENT OF A NEW VALIDATION SYSTEM

3.1DATA SOURCES

This section describes the process required to identify mistakes in the accident report form using a GIS. The variables that were investigated consisted of;

•Road class;
•Road number;
•District;
•Speed limit;
•Pedestrian crossing facilities;
•Carriageway type and markings;
•Junction detail;
•Junction control.

The correct type of feature at each location was obtained from a number of sources. Ordnance Survey maps provided information on road class, road number and the district boundaries. The location of speed limit signs, pedestrian crossing facilities and junction control type (ie: signalised, stop or give way) were obtained from paper maps within the Accident Investigation Section of Humberside County Council. Information on junction detail (ie: crossroads or T junction) and carriageway type were also obtained from Ordnance Survey maps although a field survey was required to check its accuracy. The information contained in these sources is likely to be more accurate than that from the police because it is taken directly from maps and a more detailed investigation has been undertaken to obtain the data. The coding of several items, such as whether an accident occurred at a T or Y junction is open to some interpretation. In this case, only one individual coded the network and so at least there would be consistency in the recording of these items.

3.2CODING THE HIGHWAY FEATURES

Alternative procedures to obtain the coded information for the above variables were required because of differences in the nature of the data used. Figure 1 highlights the method of coding the highway features for the above variables. The OSCAR data contains digitised links and nodes and so the variables relating to these (ie; junction detail, junction control, road class, road number and speed limit) required less data manipulation than for the others. The location of pedestrian crossing facilities had to be manually plotted onto the digital map.

For each variable the computer drew a boundary around all the respective links or nodes relating to it. This was necessary because the grid references for each accident are derived from paper maps which do not necessarily correspond to the road centre-lines or junction nodes of the digital map. All accidents falling within this zone could then be considered to be associated with that feature. For the variables of road class, road number, junction detail and junction control the radius of the zone was 24 metres. This consisted of:

- the average distance between the centre-line and the edge of the carriageway (3.6 metres);
- the maximum error in the Ordnance Survey maps (0.4 metres);
- the maximum distance to which an accident is considered to occur at a junction (20 metres).

The distance of 24 metres was also used for the variables of carriageway type and speed limit to retain consistency in the investigation method. For pedestrian crossing type, any accident located within 50 metres of a facility should have the crossing type coded. Hence, the area of influence around each facility was set at 50 metres. This would include some roads which were not associated with the road that the facility is located on, for example, those running parallel. The sphere of influence was therefore narrowed to include only those accidents that occurred within 24 metres of the centre-line of that road. The development of a wide sphere of influence could lead to some of the accidents in the carriageway type and speed limit investigation to be shown as incorrect even though they were not. That is, correctly coded accidents on a different road but inside the boundary of another feature will be identified as incorrect.

Some junctions or pedestrian crossings may be sufficiently close to one another for the zones to merge, and so the boundaries are split half way between the two features. For road class, road number, speed limit and carriageway type the zones are divided at the specific changeover point from one feature to another, although, if this is at a junction the zone will be split 24 metres from the centre of the junction along the joining road.

For district, the boundaries are digitised into the computer, and because they already represent polygons no other manipulation is required.

For each variable, the zones were coded with the respective numeric value following the criteria stated on the STATS 19 form, for example, an A class road would be coded as 3. The areas outside the boundaries were coded as zero.

3.3IDENTIFYING MISTAKES IN THE ACCIDENT VARIABLES

A flow diagram of the procedure to identify mistakes in the accident variables is shown in Figure 2. The accidents to be validated were selected and saved to a file. They were then located onto a digital map using the grid references stated on the accident record. The information describing each zone (including feature code) is linked to each accident located within its boundaries. An enquiry is then run to identify any accident where the coding taken from the highway network was different to that on the accident record. A more complex enquiry was needed to identify mistakes in road class and number, because for accidents occurring within 20 metres of a junction the class and number of the road that the accident was located on and also the road that it joins are recorded as separate fields. Hence, if an accident was located within the boundary of a classified road it would only be identified as incorrect if the highway feature code was different to the class or number in both fields.

For each variable investigated a locational plot (see Figure 3) and a table (see Table 1) was produced for all accidents identified as incorrect. The table contains the accident details including its reference number, a description of the location and the coding of the feature from the STATS 19 record and from the highway feature data. The dates that features were altered were also supplied and so those accidents that were incorrectly coded but occurred before the feature was altered would not be considered to be incorrect. Those accidents that were incorrectly located could be moved and those coded incorrectly could have that variable altered.

4.RESULTS

The number of mis-codings and mis-locations for each variable are shown in Table 2.
The mistakes in the variables of district, speed limit, road class and road number were less than 10 per cent, less than 20 per cent for junction control, junction detail and pedestrian crossing facilities and over 20 per cent for carriageway type. For all variables the accidents that were mis-located were generally randomly distributed throughout the network, but were usually close to the road that they should have been located on. This indicates that the mistakes probably arise from mistakes in selecting which 10 metre grid box the accident should be located within. Conversely, those accidents that were mis-coded were concentrated among several features. The following sections contain a more detailed analysis of the results.

4.1ROAD CLASS

Of those accidents that were mis-coded (see Table 3) 81.5 per cent were coded as unclassified and located on the B class road. In fact, 16.4 per cent of accidents on this road were coded with the incorrect class which indicates that in many instances the police were not aware that this was a classified road.

4.2ROAD NUMBER

There was a total of 82 accidents identified as incorrect, of which 78 were also identified when the road class variable was checked for mistakes. There is a close correlation between the two variables because the current computer validation procedure identifies accidents which are stated to occur on classified roads where road number is not included and vice versa. Only those accidents that were incorrectly coded as unclassified and contained no road number and those that were incorrectly coded as classified and contained a road number would not be identified by the current validation system. This system though, can identify these accidents. The accidents that were mis-coded are shown in Table 4 and the same explanations apply to this variable as to road class. There were four extra accidents identified as incorrect,of which two were coded as 6, which was the code for the road class and two had an incorrect number even though class was correct.

4.3DISTRICT

There was a total of 17 accidents identified as incorrect and all were mis-coded. One of these was located only 2 metres from the boundary and because of the possible errors when drawing the district boundaries it was not considered to be incorrect. Only one out of the 45 accidents located less than 100 metres from the district boundary was coded incorrectly. This low figure may be because large signs have been erected at the boundaries stating the change from one district to another. Most of the mistakes occurred at locations greater than 300 metres from the boundary where these signs would not be visible. In the rural areas signs are often not erected at these points and so there may be a greater number of mistakes.

4.4SPEED LIMIT

There were 97 accidents identified by the GIS validation system as being incorrect, but after comparison with the locational text three accidents occurred on roads subject to a 30 mph speed limit but inside the 40 mph speed limit boundary and hence were correct. The coding mistakes are shown in Table 5. Four of these did not have a standard speed and so an extra enquiry using the current non-geographic system should be included which could identify them.

The majority of the discrepancies (74.5 per cent) were between 30 and 40 mph roads. This is to be expected because it is an urban area with 97.8% of accidents subject to a speed limit within this range. The proportion of coding mistakes for accidents subject to 60 and 70 mph speed limits is therefore significantly higher than that for 30 and 40 mph roads, $\chi^2 = 85.4$ with 1 d.f, $p< 0.01$. This indicates the difficulties in coding this variable in the peripheral sections of the urban areas where the speed limit may not relate to the land use of the surrounding area which usually dictates it.

4.5PEDESTRIAN CROSSING FACILITIES

A comparison of the coding between the STATS 19 records and the highway feature database is shown in Table 6. The location of refuges were not included in this study because the installation dates were not obtainable.

There are 3.2 times as many accidents located within the 50 metres boundary but coded as outside than those located outside the 50 metre boundary which are coded as inside. This bias leads to pedestrian crossing facilities being shown to be safer than they actually are. The number of accidents occurring within 50 metres of a pedestrian crossing facility should increase by 37.9 per cent and this ranges from 11.6 per cent at zebra crossings to 350 per cent at subways. The existence of subway facilities are difficult to identify because they are not at grade and so many would not be identified.

Many accidents located within 50 metres of signals with a pedestrian phase were coded as pelicans and an additional 23 accidents were stated as being located within 50 metres of a refuge but were located within the boundary of a traffic signal. At these sites the refuges were used to stagger the pedestrian crossings and so should be counted as a signalised junction with a pedestrian phase since this is the dominant feature type.

4.6JUNCTION DETAIL

Private drives and other junctions (such as alleyways) were not coded onto the map and so accidents occurring at these types of junction were not checked for mistakes. Those accidents that could not be accurately located from the text were stated as being mis-coded. Of the 124 accidents that were mis-located, 85.5 per cent of them were those accidents which were coded as 20 metres or less from a junction but located outside this boundary. This is because for most junction accidents the locational text states more than one road and so the accident can precisely located, whilst for many non-junction accidents only the road name is included.

Table 7 compares the coding of junction detail between the STATS 19 records and the highway feature data. There were 3.2 times as many accidents located within the junction boundary but coded as not at a junction than those located outside the junction boundary and coded as occurring at a junction which is the same level as for pedestrian crossing facilities. This bias results in an underestimation of junction accidents to the order of 3 per cent.

T-junctions accounted for 63.5 per cent of the mis-coded accidents. This is to be expected because 65.7 per cent of junction accidents occurred at this type of facility. The same comparison can be made for crossroads which contained 22.4 per cent of junction accidents and 19.1 per cent of mis-coded accidents.

There were 44 accidents that were coded as occurring at a junction but contained an incorrect junction code, of which 66.3 per cent were discrepancies between cross-roads and T-junctions. This highlights the difficulty in distinguishing between these types of junction.

4.7JUNCTION CONTROL

All the accidents that were coded as occurring within 20 metres of a junction but were located outside this boundary, and all the accidents coded as not within 20 metres of a junction but were located within this boundary were identified in the junction detail investigation. This included all the accidents that were mis-located and 55.9 per cent of the mis-coded accidents. Uncontrolled junctions were not investigated because the majority of accidents (66.9 per cent) occurred on private drives or other junctions. Table 8 compares the coding of junction control between the STATS 19 records and highway feature data.

There were 49 accidents coded as give-way which were within the boundary of traffic signals. Both give-way and traffic signals existed at these sites and so all of these accidents must relate to signals as well as give-ways (except possibly for rear end shunts on the give-way leg). There is no guidance in the manual which explains the coding of these variables as to which type of junction control should be coded in these circumstances although traffic signals are the most dominant control type and should be coded as such.

4.8CARRIAGEWAY TYPE AND MARKINGS

A total of 402 accidents were identified as incorrect for this variable, although 8 were correctly coded accidents located on a different road but inside the boundary of another carriageway feature. A comparison of the coding between the STATS 19 records and the highway feature data is shown in Table 9. The types of carriageway with the greatest level of mis-coding were for dual two lane, single three lane and single 4 or more lanes. This is because of difficulties in coding the carriageway type at junctions with turning lanes and along roads with bus lanes.

There were 43 mis-coded accidents located at junctions where the number of lanes were increased to facilitate turning traffic. There were:

- 14 accidents coded as single 3 lane when the general carriageway type was single 2 lane;
- 13 accidents coded as single 4 lane when the general carriageway type was single 2 lane;
- 16 accidents coded as dual 3 or more lanes each way when the general carriageway type was dual 2 lanes each way.

There is no guidance in the manual which explains the coding of the variables as to whether this item should be coded to include these lanes or not. But for the purpose of analysis the general carriageway characteristics would be more useful.

Of the accidents that were mis-coded, 192 occurred along a 2.75 kilometre stretch of road incorporating a bus lane. This section included three and four lane single carriageway road incorporating a bus lane and sections of two lane single carriageway road without a bus lane due to road width limitations. Only 29.8 per cent of accidents along this stretch of road were coded correctly. The level of accuracy for the individual section types were:

- 58.2 per cent for single four lane;
- 82.6 per cent for single two lane;
- 1.4 per cent for single three lane with a 5 metre lane in one direction and two 2.5 metre lane in the opposite direction(one of which was a bus lane).

These results indicate that bus lanes were generally not considered as a lane in carriageway type. They should be included because vehicles use these lanes at all times, even though some classes of traffic are prohibited during certain periods. Bus lanes do not continue across junctions and it could be argued that at these points single two lane carriageway exists. But, the general characteristic of the road is still single three lane carriageway and the small gap in the sections cannot really be regarded as a change in carriageway type.

A further study to investigate the accuracy of the carriageway type variable on roads with bus lanes would be useful to ascertain whether the results of this study are unique. There also needs to be a directive as to whether turning lanes at junctions should be added to the standard number of lanes in the coding of carriageway type.

5.CONCLUSIONS

This GIS based validation system has successfully verified mistakes in the coding and locating of accidents not identified by the current system. For the variables of road class, road number, speed limit and district the level of mistakes were less than 10 per cent. This low figure is probably because the features are unambiguous and are recognised by people with some local knowledge. The level of mistakes for pedestrian crossing facilities, junction detail and junction control were between 10 and 20 per cent. All require the estimation of distance and so it is probably inevitable that a greater number of mistakes will be made. Carriageway type was the most inaccurately coded variable, mainly due to uncertainty as to whether bus lanes should be coded as an additional lane or not. This may be a peculiarity of the sample and a larger study should be undertaken to identify if this phenomenon is unique.

This system would be particularly useful as part of a routine validation procedure, but to achieve this it is necessary to update, move and add highway features. Figure 4 shows the procedures required to accomplish this. One of the major problems of the current method is the locating of accidents by the bottom left hand corner of the 10 metre square. Some local authorities already use a GIS to code accidents directly onto the digital map. A commonly available computer programme is then used to move then accident to the road centre-line or junction intersection (if the accident occurred less than 20 metres from a junction). The GIS validation programme can then be used to check the accuracy of the variables. This is a more accurate method of locating accidents and removes the need for a wide zone boundary which can allow correctly coded accidents on a different road, but inside the boundary of another feature to be identified as incorrect.

The checking of errors could be expanded to include vehicle details. About 90 per cent of the vehicles on the STATS 19 records were linked to the Driver and Vehicle Licensing Agency (DVLA) database using the variable of registration plate (Department of Transport, 1992) and this information could be used to validate the variables of maximum gross weight and vehicle suffix.

If all highway authorities adopt such a system it could mean that over 2.2 million fewer items of data need to be collected nationally by the police. The annual costs of recording changes in the road network are likely to be minimal and the information could be used for other purposes. The system could ultimately result in a greater level of accuracy and cost efficiency in collecting the data.

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7.REFERENCES

AUSTIN, K.P. (1993). The development of a comprehensive database for accident analysis. *Paper presented at the 25th Annual Conference of the Universities Transport Study Group*, held at Southhampton University, January 1993. (Unpublished).

BULL J.P. and ROBERTS, B.J. (1973). Road accident statistics. A comparison of police and hospital information. *Accid. Anal. & Prev*. **5**, 45-53.

CAMPBELL, H. and MASSER, D. (1991). The impact of GIS on local government in Great Britain. *Conference of the Association of Geographic Information.*

DEPARTMENT OF TRANSPORT, (1991). Car and driver injury accident rates. Great Britain 1989. *Transport Statistics Report*. HMSO, London.

DEPARTMENT OF TRANSPORT, (1992). *Road Accidents Great Britain 1991*. HMSO, London.

HOWARD, B.V, YOUNG, M.F. and ELLIS, J.P. (1979). Appraisal of the existing traffic accident data collection and recording system. South Australia. *Report number CR6*. Department of Transport, Australia.

IBRAHIM, K. and SILCOCK, D.T. (1992). The accuracy of accident data. *Traff. Eng. & Ctrl.*, **33**, pp 492-496.

SHINAR, D and TREAT, J.R. (1983). The validity of police reported accident data. *Accid. Anal. & Prev.*, **15**, pp 175-191.

Table 1:A sample printout of details from accidents with road class identified as incorrect.

Accident reference number	STATS 19 code	Highway feature code	Location
96887	6	0	FAIRFAX AVE/BRICKNELL AVE XRDS HULL
16988	6	0	A1079 BEVERLEY RD/SCULCOATES LA/QUEENS RD
39590	3	6	A1174 ABOUT 200 M NORTH OF DUNSWELL RBOUT
9591	4	6	B1233 COTTINGHAM RD/HALLRD/HOTHAM RD
159690	6	4	THWAITE ST 50M EAST JW THE PADDOCK
113591	6	4	HULL RD JW BRICKNELL AVENUE
143290	6	4	COTTINGHAM RD JW HARDY STREET
47290	4	6	COTTINGHAM RD 100YRDS WEST JW NEWLAND AVE
125187	3	6	A1079 BEVERLEY RD JW PEARSON AVENUE HULL
61090	3	6	A1079 BEVERLEY RD JW GROVE STREET HULL

Table 2:The number of accidents mis-coded and mis-located for several variables on the STATS 19 record.

Variable	Number Mis-coded	Number Mis-located	Percentage mistakes
Road class	27	51	4.1
Road number	31	51	4.4
Speed limit	83	45	6.8
District	16	0	0.8
Pedestrian facilities	282	46	15.3
Carriageway type	346	48	20.9
Junction detail	115	121	12.5
Junction control	127	121	13.2

Table 3:A comparison in the coding of road class between the STATS 19 records and highway feature data.

Highway feature data / STATS 19 data	A	B	Unclassified
A	**500**		

B		**134**	
Unclassified	5	22	**1223**

Table 4:A comparison in the coding of road number between STATS 19 records and highway feature data.

Highway feature data STATS 19 data	1079	1165	1174	1233	None
1079	**422**				
1165		**67**			
1174	1		**9**		
1233				**134**	
None	2	3		22	**1221**
Other	1				2

Table 5:A comparison in the coding of speed limit between STATS 19 records and highway feature data.

Highway feature data STATS 19 data	30	40	60	70
30	**1677**	41	3	
40	20	**96**	6	2
60	2	1	**28**	
70		1	3	
Other	4			

Table 6:A comparison in the coding of pedestrian crossing facilities between STATS 19 records and highway feature data.

Highway feature data STATS 19 data	Zebra	Pelican	Signal	Subway	Others	Outside
Zebra	**60**					10
Pelican		**129**	30			36

Signal			**42**			7
Subway				**5**		1
Others			23		**17**	
Outside	18	81	54	22		**1349**

Table 7:A comparison in the coding of junction detail between STATS 19 records and highway feature data.

hway feature data / STATS 19 data	Not within 20 metres	Roundabout	Mini-roundabout	T	Y	Slip road	Crossroads	Multiple	Private drive	Other
Not within 20 metres	**543**			46			8			
Roundabout	1	**69**	1	1						
Mini-roundabout		1	**3**							
T	13			**756**	1		11			
Y				2	**5**		3			
Slip road				1						
Crossroads	3			17			**274**			
Multiple				3						
Private drive									**109**	
Other				3						**9**

Table 8:A comparison in the coding of junction control between STATS 19 records and highway feature data.

Highway feature data / STATS 19 data	Give-way	Stop	Signal	Uncontrolled	Not within 20 metres
Give-way	**876**		49		13
Stop	3				
Signal	4		**195**		4
Uncontrolled				**142**	
Not within 20 metres	52		2		**543**

Table 9:A comparison in the coding of carriageway type and markings between STATS 19 records and highway feature data.

STATS 19 data / Highway feature data	Roundabout	One way	Dual 2 lanes	Dual 3 or more lanes	Single track	Single 2 lanes	Single 3 lanes	Single 4 or more lanes
Roundabout	**71**					3		
One way		**3**				1		
Dual 2 lanes			**154**			7	2	15
Dual 3 or more lanes			21			2	3	2
Single track					**3**	3		
Single 2 lanes	1	4	11			**1127**	113	52
Single 3 lanes			1			26	**25**	14
Single 4 or more lanes						22	32	**155**
Unknown						10		1