



## M. Modelling of Motorway Merges

### M.1 Introduction

In SATURN, motorway merges have historically been difficult to represent satisfactorily in congested conditions. The available method of coding has been to apply what Saturn calls a turn priority marker M to the merge link. This informs the program that traffic on that link has to give way to mainline traffic in a predetermined way. It is similar to a give way junction, but takes account of the fact that merging traffic does not necessarily come to a halt, and only gives way to one direction of traffic. It therefore has more capacity than a standard give way junction.

This method usually works where conditions are reasonably free flowing. However, it works less well in congested conditions, and can result in huge and unrealistic delays to merging traffic. It also assigns all junction delay onto the merge and none on the main line, which is not a true reflection of how merges are observed to operate. In reality, delay at a merge junction affects both the merge and the mainline traffic although not necessarily equally.

Since Version 9.2, SATURN has offered an alternative way of coding merges called the Q marker, which came about as a result of a recommendation in COBA. This marker is coded downstream of the merge junction, and assigns a calculated delay to every vehicle which goes through it, causing delay at the merge junction. With this method, delays are at both merge and mainline traffic streams, as in observed cases. However, as discussed later, there are some problems with this method, as the delay can be overestimated under congested conditions.

Because the above methods given in the manual do not work well under congested conditions, many users have devised their own ad hoc ways of coding merges which try to reduce merge delays. The result is that between different organizations, and sometimes even within the same organization, motorway merges are being coded differently for different schemes.

### M.2 Current Status

**Withdrawn for review in December 2010 - please contact Atkins for the latest advice.**



### M.3 Version Control

JOB NUMBER: 5101396		DOCUMENT REF: App M.doc				
Revision	Purpose / Description					
		Originated	Checked	Reviewed	Authorised	Date
1	Re-formatted (Final to DVV)	TF / BG	NS	IW	IW	06/05/06
3	Upgrade to V2 Template	DVV	IW	DVV	IW	28/06/06
3.2	Web release – Sept 06	DVV	NP	IW	IW	08/09/06
3.3	Web release – Jan 07	DVV	NP	IW	IW	04/01/07
3.4	SATURN v10.7 Release	DVV	NP	IW	IW	12/03/07
3.6	SATURN v10.8 Release – New Appendix for Motorway Merges	TL	NP	IW	IW	09/02/08
3.7	Web release – Jul 08	DVV	NP	IW	IW	07/07/08
3.8	Web release – Dec 08	DVV	NP	IW	IW	12/12/08
3.8.21	Web release – Feb 09	DVV	NP	IW	IW	16/02/09
3.8.22	Web release – Jun 09	DVV	NP	IW	IW	16/06/09
10.9.10	SATURN v10.9 Release	DVV	DG	IW	IW	04/09/09
10.9.12	SATURN v10.9 Release	DVV	DG	IW	IW	22/10/09
10.9.22	Withdrawn for Review					
10.9.22	Web release – Dec 10	DVV	AG	IW	IW	06/12/10
10.9.24	SATURN v10.9 Release (Full)	DVV	AG	IW	IW	06/05/11
11.1.09	SATURN v11.1 Release (Full)	DVV	AG	IW	IW	31/03/12