# Transport

There are two things that annoy me about our current motorways. The first is the congestion the second is people saying a 4th lane would solve it.

My own observations have led me to conclude that the biggest cause of congestion is ghost Jamming, and the biggest cause of ghost jamming is one lorry trying to overtake another at an additional speed of 1 mile per hour while the pair of them proceed to race at a speed of 10 miles per hour less than the traffic travelling behind them. Once this simple fact is noted it is easy to see a solution. Limit all Freight to 50mph and No over taking!!

Another simple idea although one that is probably easily challenged is the idea of the Green Motorway, this idea came to me one night whilst I was thinking about developing the Scottish Highlands. I tensed at the thought of Motorways cutting their swathe through such beautiful scenery. It is now most appropriate for the East-West link over the pennies.

Rather than approve another Tarmac eyesore though the Peak district (which will never happen I hope) instead use Hovercraft to move containers from Sheffield to Manchester. The speed with which this could be done is second to none, and providing an appropriate route can be found we would have a Green Motorway. And that is ‘How’ you solve congestion on Snake Pass.

Why not Hovercraft instead of Trains. They could act like intercity Taxis and could carry a lot of people. Think of the saving in Railway steel.

# Agent Modelling

The M54 – M6 link is perhaps the worst example of traffic congestion (I have yet to experience the delight of the M25).

Having traversed this slow link at rush hour and even upto 12pm on a number of occastions I began lane hopping. This has led me to a strategy for travelling through traffic Jams on motorways. The point being that I now have the potential for Agent strategies in a traffic simulation model.

Investment is it would seem available and the issue is apparent. But how do we reduce Congestion (if indeed we can) by adapting the road network. It is a serious question because if we can prove (however unpopularly) that increased investment produces no benefit or benefit over such a short period we face the resignation of accepting alternative strategy’s like road tax and Government owned public transport. (Shock horror get that commie from out under my bed!).

In developing a model of the Motorway system I note that there are a finite number of impactors to congestion.

Given space enough for an additional car to be on the road what contributes to the Congestion.

There are two things

Those that the motorway driver can’t control and those that he can.

Considering the Ghost Jam as one thing he can control I propose to consider the arrival of a new vehicle or the departure of an existing vehicle as those events external to his control.

## Previous Research in the area:

Human movement in and out of the NEC Arena

## Considerations and assumptions:

Q: Do agents contribute to the problem of congestion? A: Yes. Obvious example Speeding/Tailgating and Ghost Jams

Behaviour in a Jam:

Agent A: Present for next 10 miles Patiently waits in a single lane {A,B,C}

Agent B: Waiting to leave at next off ramp Waits patiently in {B,C} until nearly at off ramp then Joins {A}.

Agent C: Waiting to leave at next off ramp waits in {A}.

Agent D: Present for next 10 miles Switches Lanes when Lane is moving faster than his. {Delay attributable to manners, speed of thought, manners of other drivers} (No particular strategy)

Agent E: Present for next 10 miles Switches lanes but has strategy. {Me!}

The point of these groups is to illustrate how behaviour whilst appearing to be beneficial to the driver is in fact the opposite to both himself and the larger network.

Let us consider the two external factors and the effect of the agents in combination with them.

Off Ramp:

Agent A: Has no increased contribution to make beyond the potential for tailgating.

Agent B: If miss timed has the potential to increase braking and send the ghost Jam signal back up the network.

Agent C: Like A uses the best strategy for minimum contribution to increased congestion.

Agent D:

To think about this agent on their own is unhelpful in this context. Similarly it is more interesting to think of the whole Node Event rather than as on or off.

# So…

Consider Agent D in conjunction with Agents B & C. And consider each of the lanes as Queues with a capacity and a network speed.

When Agent D makes a choice he changes the capacity of both the Lane he leaves and the Lane he enters similarly with an increase in Capacity we see some amount of a Ghost signal back up the network (dependent upon the manners of the people he Joins in front of) and a decrease in speed.

In the same terms when Agent C leaves the Motorway his lanes capacity decreases and so the speed increases (fill the space) this is fools gold because at the other side of the junction is another Agent C: waiting to Join and create a rebalance (if xoff=xon).

SO we now have the potential for a set of equations which can explain the flow of traffic on our Motorway with, in this case particular emphasis on a junction.

What is interesting to notice is less the total effect on flow during a Junction event as much as the effect of the junction event on each of the lane flow totals.

Each Junction can be thought of as being particularly likely to be more off than on or vice versa.

Consider more off than on. The Junction event creates a reduced capacity in A B and C in accordance with Proportions Pa Pb and Pc dependent upon the strategy’s employed by the members of each queue/set.

Notably most in A: However because of the nature of the attributes of each of the members of each queue the potential is less realised when it occurs in A etc hence Pot A > Pot B > Pot C but Realised Pot in A tends to < Realised Pot in B < Realised Pot in C. This might suggest that as speed increases and danger/risk increase the willingness to co-operate increases.

Back to the point. Through the Junction Event. Leading up to the off ranp the potential of A increases but as you passs the off ramp that potential stops increasing and starts to decrease as the potential is taken away by the arrival of new C’s. Similarly Potential B on the approach is Less than or equal to A but after the off ramp its potential is taken away at a lesser rate and the same for C only less so.

What is interesting when at the on ramp during times of heavy congestion is that some vehicles move out into B as soon as possible to increase the potential of A and so allow more vehicles on.