

Experiences with ImFlow in Cheshire East - challenges and successes

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Synopsis

Cheshire East Council engaged SWARCO to deploy its latest adaptive traffic optimiser, ImFlow, at several problematic junctions. These junctions were previously under Fixed Time, Vehicle Actuated or MOVA control. Has ImFlow made things better?

Problem Statement

During the Covid epidemic Cheshire East Highways (CEH) made the decision to turn off their UTC system. It had been impacted by communications issues, which were proving difficult to resolve, and most junctions had been running under VA control for some time.

Following Covid, traffic flows slowly started to increase. CEH was also looking towards the development of the HS2 hub in Crewe, which would increase traffic flows in and around the town considerably. Our Strategic Infrastructure, Active Travel, Transport Services, and Air Quality teams were all looking at the Crewe network with potentially conflicting objectives or policies and were looking to the Traffic Signals team for solutions.

Whatever solution we proposed therefore needed to consider the following stakeholders:

- Motorists wanted shorter more consistent journey times and less queues.
- Bus drivers wanted priority over other road users and again more consistent journey times and less queues.
- Cyclists wanted better facilities at junctions including priority over other road users.
- Pedestrians and vulnerable road users wanted more crossing points and reduced waiting time for pedestrians and vulnerable road users.
- Everyone wanted improved air quality.

EVERYONE WANTED PRIORITY OVER EVERYONE ELSE.

However, anything which favours cyclists or pedestrians usually has an adverse effect upon motorists and air quality. Anything which favours motorists has an adverse effect upon cyclists and pedestrians.

We therefore needed a flexible method of control which could be quickly and easily modified to allow us to achieve a reasonable balance for all users.

We also had to consider advancements in technology such as vehicle detection, especially in relation to being able to accurately identify vehicle types, and data exchange.

We therefore needed to ensure our systems are ITS & C-ITS compliant "Cooperative Intelligent Transport Systems" enabling them to be able to connect to and share data with other infrastructure and users.

Why ImFlow

Past, and to some extent most, methods for controlling traffic signals have been based around optimising junction or network performance to reduce vehicle delay with little thought given to other highway users.

However, this is no longer acceptable. We now have policies dictating how the road should be managed with a much greater consideration given to pedestrians, cyclists, bus users and air quality. These policies are often politically led and although all are important, their order of priority tends to change over time.

We needed a fully adaptable network management tool which can consider all road users and can be easily changed to give priority of one user over another as time dictates. For example, by time of day, day of week or due to change in overarching authority or government policies.

With regard to optimisation, ImFlow offers excellent optimisation of a junction along with intelligent cooperation between junctions. More flexible phase and stage transitions potentially offer more green light time overall.

What we have done

We initially "sold" the idea of ImFlow to the Council's Air Quality team as a way of improving traffic flow at a roundabout which was causing long queues along Nantwich Road, one of the main routes through Crewe.

Whilst this was still being progressed our Strategic Network team approached us about the need to increase capacity at two junctions close to the town centre which were running FT plans due to their proximity and short 'internal lane' stacking space.

Close on the back of this was the need to provide adaptive control along the main part of Nantwich Road in Crewe.

Funding for all was very tight and no allowance could be made for any pre or post scheme monitoring apart from the collection of traffic counts for some modelling.

The focus for all commissions was to reduce delays and try and get traffic moving. Therefore, all works were done with a focus on optimising traffic flows. The Nantwich Road route used AI cameras with the intention of allowing us to move to policy-led control in the future, once we were happy with ImFlow's operation.

Before and after

Funding for the upgrades was very tight and no allowance could be made for any pre or post scheme monitoring apart from the collection of traffic counts for some modelling.

Anecdotal evidence tells us that traffic flow has significantly improved since switching on ImFlow compared to what was expected at that time of day. "Where did all the cars go this morning?" was an unsolicited comment from a colleague. Driving through the upgraded junctions showed traffic moving a lot more easily than before.

Lessons learned

Project

Communication is key: the need to keep all stakeholders informed of progress is important.

Time Scales: do not assume it will go to plan. Expect problems and delays. However, work together to resolve or manage the project. Get weekly updates, even if it is just a quick call.

Ensure you have funds for a before and after study.

Traffic engineering

When implementing a highly adaptive system do not add manual workarounds to extract every last drop of performance; this hinders its ability to automatically adapt and only delivers small benefits.

Detection that is adequate for other modes of control may not be ideal for adaptive systems. Detecting the presence of some traffic is good enough for VA, but ImFlow works best with an accurate queue model and benefits from accurate counts at every detection point.

ImFlow works well with any detector that can provide an accurate vehicle count. Road layout is the most important consideration when positioning detectors.

Enforcing the use of microsimulation can reveal simple changes that provide significant benefits.

What's next?

A move to policy led optimisation through AI control including “policy sliders” for:

- Cars / small vans
- Buses
- Emergency vehicles
- HGV's
- Cyclists
- Pedestrians
- Air quality

Collection of some pre (turn it all off) and post ImFlow data, and production of a report - watch this space.