

Summary of Agency Interviews

Interstate Operations

Active Traffic / Lane Management

The vision for both IDOT and the Tollway is active traffic management, and active lane management. It will be in place in the future, but the Tollway is in a better position to accomplish this within a shorter timeframe. The Tollway has significant resources, field equipment already in place, a well-functioning traffic management center and close communication with emergency responders. IDOT is at a disadvantage in this area, and developing the system will take longer. While the District 1 ComCenter is an expressway incident management and operations center, it may not have the space to host equipment and staff for full traffic and lane management activities. The ComCenter dispatches emergency traffic patrol, but it does not monitor the vehicle detection system or communication with emergency responders. The Traffic System Center in Oak Park monitors the vehicle detection system and might be repurposed as the IDOT TMC.

The active traffic management and lane management the agencies are considering includes managing shoulder lanes, congestion pricing, providing information about downstream lane closures, and speed harmonization.

Incidents

Similar to the arterial operations discussions, the role of communication between the emergency responders and the highway operator is viewed as an important contributor to improved highway operations. This communication allows the highway operator to provide public information, repair damaged equipment and provide traffic operations support when needed. The Tollway benefits from having the Illinois State Police in the same building, and by sharing information through the computer aided dispatch system. The Illinois Department of Transportation is still working to finalize agreements with Cook County and the Illinois State Police for similar information sharing. A similar sharing of building space is not planned for IDOT.

The discussion of how incident clearance can take place more quickly focused on detection and verification. While the operators agreed with arterial operators that the “process” of emergency response was out of the hands of highway operators, they might still reduce incident duration by shortening the time between occurrence, detection, and verification using ITS technology. Cameras can be installed in enough locations that the whole facility can be monitored. Automatic incident detection has been tested and seemed successful in the past, but it was very costly. They felt that the implementation of managed lanes was going to make this even more important, because it will be critical to keep incidents from blocking the managed land and impacting service levels.

Both IDOT and the Illinois Tollway have emergency patrols which provide assistance for drivers. These programs are seen as very effective, and expanding the geographic coverage is important for improving highway performance. Only lack of resources prevents this.

The Tollway contract with towing companies requires arriving on-scene in within a specified number of minutes. Towing operators are penalized if they take longer to arrive. On the IDOT side, tow truck drivers are required to attend IDOT sponsored to be eligible to be on the call list.

Performance Monitoring

The Tollway has implemented real time performance monitoring system. The next step will be to review the information it generates and begin to establish performance goals. IDOT has not yet implemented this type of system.

Having computer aided dispatch (CAD) system integration between the interstate operators and the emergency responders provides an opportunity to measure incident clearance performance. The tollway includes performance goals for tow truck operators to arrive at the scene, with penalties for arriving late. Tracking performance has not been a common exercise.

Construction Management

Closing of entire facilities on the interstate system is rare. Most often it is related to demolishing or building structures for bridges or ramps. Lane closures are limited to times when traffic is lowest which generally means between 1am and 4 am.

Construction and travel time information is provided on variable message signs and through TravelMidwest. IDOT and the Tollway employ technology so they can monitor travel times in work zones.

Weather Management

Agencies supported the idea of weather-responsive traffic management on the interstates, for example, by reducing speed limits when there is water on the pavement or icy conditions.

Traveler Information

The interstate system was the first part of the transportation system to be included in the TravelMidwest website. Some parts of the system are not covered by vehicle detection systems: I-57 south of I-80, some of the western portion of I-80, and small segments on I-55.

Traffic Management Center Status

Illinois Tollway - Traffic Incident Management Center (TIMS) includes integrated computer aided dispatch with the Illinois State Police and the real time performance monitoring system. Information shared between the Tollway and IDOT such as variable message sign requests is shared with the IDOT ComCenter. The center operates 24/5 with the state police taking over on the weekends. It will go to 24/7 soon.

Illinois Department of Transportation – ComCenter functions as the traffic incident management center for the expressways, controls the Highway Advisory Radio system and the Kennedy Expressway

reversible lane control. The ComCenter communicates with the Gateway traveler information system and dispatches emergency traffic patrol and maintenance vehicles. This location also hosts Gateway staff 24/7/265. The ComCenter does not communicate vehicle detection equipment, but does communicate with expressway variable message signs. IDOT does not have an arterial traffic management center.

Arterial Operations

Signals

Interconnects- All of the agencies that operate arterials have traffic signal interconnects. They all feel that there are more locations where signal interconnect systems would be beneficial – they haven't run out of places that would benefit from them. At least one agency has a backlog of CMAQ funded signal interconnects that they want to accomplish. The main impediment to completing these is lack of staffing.

Modernization - All the agencies intend to modernize the signal systems over time. One hindrance to this is even old signal systems turns the lights red and green. The public doesn't perceive whether signals are operating efficiently, and so it doesn't provide an apparent and compelling reason to increase maintenance or be replaced. However, not modernizing a signal has costs that aren't always appreciated. When the signal gets old, it gets more difficult to update and tends to break down more frequently. It also can't support other improvements like transit signal priority technology. In the suburban areas, the capital program which widened arterials became a de-facto signal modernization program. When the road was widened, the signals were replaced. In the city of Chicago, transit signal priority and bus rapid transit projects have recently spurred signal modernization. Unfortunately, the extensive signal modernization needed to implement these transit projects adds a large amount to the project cost. What is perceived as a "lower cost" transit solution turns out to be much more expensive because of the backlog of old signal technology. In the suburbs, the reduced rate of capacity addition has slowed the rate of replacing signals. Agencies expressed concern that this situation was going to reduce their ability to modernize signals.

Central Signal Control - All of the agencies desired central signal control systems. Central control makes it easier to monitor and manage the signal systems in real time, especially when combined with cameras or microwave detection so traffic conditions can be viewed. Operators can receive reports on equipment status and make changes to signal operations without having to send someone out into the field.

Special Signal Plans – Some implementers developed special signal plans for special events such as festivals and sporting events. On the whole they are relatively uncommon because of the difficulty of developing and implementing them. A central signal system with cameras makes this much easier. Instead of sending an engineer out to each signal and implementing the plans, an engineer can view and adjust signal timing in real time from the office.

Adaptive signal control – A number of implementers have installed or are in the process of implementing adaptive signal controls. One interviewee commented that the travel time savings at the locations hasn't been huge, but the throughput has increased 15% - 40%.

Interagency Signal Coordination - Most agencies expressed a desire to view and coordinate traffic signal operations with adjacent jurisdictions. Many of the major roadways within each county are under IDOT jurisdiction. IDOT and the counties have, over time, developed agreements and procedures that allow the county TMC's to view and initiate changes to IDOT traffic signal operations under unusual traffic conditions. IDOT traffic signal engineers are assigned to each county, and this person is the contact point for negotiating changes. This arrangement is expected to continue into the future. Lake County Passage TMC includes an office for IDOT staff use. IDOT still maintains responsibility for monitoring and adjusting signal operations as a part of its normal maintenance schedule. Some agencies wondered whether IDOT could provide other kinds of support in return for their monitoring and managing the signals, while acknowledging that IDOT was also not well resourced in this area.

Lamps - The changeover from incandescent lamps to LED lamps had a big impact on electric bills. For example, an intersection whose electric bill was previously \$150 / month was reduced to \$30 / month. Even LED lamps don't last forever. Over time they become dim and must be replaced. Not all agencies have a plan for this.

Malfunctions – Switching to LED has had other good consequences. For traffic signals with uninterruptable power supplies, the battery can power an LED signal for 12-18 hours during a power outage, rather than the few hours for incandescent lamps. One interviewee believed the LED combined with battery backup could probably eliminate 80% of lights going into red flash mode. One often overlooked component needed to protect traffic signal system functioning is to include battery backup in the communications cabinets. Battery backups were frequently included in the signal cabinets but infrequently included in the communications cabinets. Communication can be lost between signals and a central system in case of a power outage. The region should support critical retrofits such as these.

Most agencies use a contractor to maintain the signals. Including contract performance standards for making repairs was a common practice. One implementer reported that their police and fire department had a direct number for the maintenance contractor and called the contractor directly if there was damage to the equipment. This gets the repair completed faster, especially on evenings and weekends when department of transportation staff are not on duty.

Incidents

Unlike the interstates, where systems can be set up to monitor the roadways and detect and initiate a response to incidents, the arterial operators did not express a desire to focus on arterial incident detection and verification. Rather, they viewed their role as collecting and distributing public information about the incident as a customer service to drivers and to direct traffic away from incident locations. Timely communication also allows them to clean up the scene and make repairs as quickly as possible afterwards. Except in the most serious cases, they also did not express a desire to participate in traffic control at the incident scenes. They seemed satisfied with emergency responders controlling

traffic at the scene but were concerned with some basic safety procedures. An example was given of police officers directing traffic at a dark location while wearing dark clothing and no high-visibility gear. Agencies believe that having a person standing in the street directing traffic is inherently dangerous and should be avoided if possible.

The ease of establishing communication between emergency services and the DOT sometimes depends on the bureaucratic structure of the organization. A department of transportation may find it easier to establish communication with its sister municipal police or fire department. It may not be so easy to establish communication with a fire protection district or a county police department. It is important to develop standard procedures for the communication so it does not rely on personal relationships.

Some agencies are considering including the ability for emergency responders to control traffic at intersections from the controller and eliminating the need for an officer to stand in the roadway.

Performance Monitoring

Agencies expressed a desire to monitor traffic activity at signals to improve performance. None of the arterial operations agencies have the staff or computer infrastructure to monitor real time probe data. Often the probe data was perceived as a source of information to provide real time traveler information more than a way to monitor system performance. The ability to use the data to send a message to operators when the travel time varied from what was expected was seen to be helpful. The agencies also believed it would be helpful in reviewing what was happening during special events, both to help develop signal plans and to monitor how their special signal timing was working.

Input oriented performance measures were cited as more likely to happen in the short term. These would include ability to maintain signal retiming schedules, how much time it took to repair malfunctioning signals, and frequency of equipment malfunctioning. Most of the agencies relied on maintenance contractors to make repairs to field equipment. The importance of efficient contractors was cited, and also the inclusion of performance standards for the contractors' maintenance activities.

Construction Management

Most of the agencies already review the costs and benefits of the decision whether to maintain travel lanes, allow a partial closure, or completely close a roadway. For arterials, roadways are close to homes and businesses, so overnight work is not an option. IDOT maintains a standing Project Detour Committee at District 1 to plan for project construction. Implementers also meet together to discuss upcoming construction projects, how the project will proceed, and detour plans.

Providing traveler information about closures was seen as a critical part of construction management for the agencies. Some agencies have their own websites and notification systems, and the agencies also provide the construction location information to the Gateway for distribution on TravelMidwest website and notification system. IDOT is developing an arterial lane closure permitting system. The system is online, and contractors use it to apply for permits to close lanes. The information is sent electronically to the Gateway.

Agencies also used speed feedback signs to help control speed around construction zones. This makes the zone safer for workers and reduces the potential for further disruption caused by accidents.

Agencies often provided detour information, but on larger roadways it was helpful to respond to what traffic did rather than try to guess at the best detour. This of course is made much simpler with a central traffic signal system and cameras. In many cases planned detours were not the routes taken by most traffic. A good example of this is IL-59 at I-88. This is a major interchange that was closed for reconstruction as a modern diverging diamond interchange and opened in September 2015. How traffic would reroute was unknown so DuPage County traffic engineers watched the traffic and adjusted signal timing to accommodate the new traffic patterns. Using this real time management, they were able to keep traffic flowing relatively well even with a major interstate interchange closed.

Performance bonuses for early completion have been used in the region and seemed to be effective.

Automated Enforcement

Automated enforcement has been shown to be effective. It improves safety when it is installed at the correct location. Expanding its use is a political decision. The speed feedback sign is a soft automated enforcement program that is not controversial. The system includes a speed detector and feedback sign to warn drivers. They are popular and are perceived to be effective.

Weather Management

Viaducts and grade separations often have an associated pumping station for drainage. Some of these stations have backup power and some do not. Some agencies suggested that they'd like to stage equipment in the field to pre-empt expected rain caused disruption but budget and staff are not available to do it.

Parking Management

Most of the roadways managed by IDOT and the counties already do not allow parking. In cases where parking is allowed, suggesting changes was viewed as unlikely to be successful because of conflicting goals of the road operator and local business community. Therefore, parking management is viewed as a municipal issue. The City of Naperville owns a number of garages and provides online information about parking availability. They do not charge for parking. They experimented with parking charges in the 1970's but were unhappy with observed outcomes and are unlikely to do it again. Parking availability and navigation guidance are important, both for municipal parking and transit parking.

The region should eliminate manual traffic control at access/egress points. Some examples of where this occurs are at special events, churches, schools and shopping centers. Manual traffic control is dangerous and unnecessary.

Traveler Information

The agencies desired to provide all of the information about travel conditions to the public. Traveler information can help to balance traffic and steer people away from incidents. Some observations interviewees made were:

- People have smart phones that can function as an in-vehicle terminal and have access to information, so we don't necessarily need a lot of roadside signs.
- Arterial speed information can't be generated by agencies. Probe data has to be purchased. Lake County has purchased its own data – what about the rest of the region? Can resources be pooled?
- Every operator should not be forced to build his own website and notification service. The region should share resources and information to supply a single source. We need to make sure there is adequate capacity on TravelMidwest or another site. Why should a person who leaves Lake County have to find a new website for information when he gets into Cook County?
- We should also rely on private industry to provide traveler information, because they are doing a good job too.

Traffic Management Centers

A traffic management center consists of hardware, software and staff. These resources can be focused on a single system, distributed or shared. Some interviewees thought that the region should combine resources and create a regional center. In this way, center to center TMC communication wouldn't be necessary. There would be just one set of hardware and software to purchase and maintain. It could be staffed 24/7.

All of the traffic management centers either currently or plan to share video with police and fire departments. Providing this service has been one of the ways departments have been able to convince the police and fire to reciprocate with incident information. Developing agreements to share the incident information continues to be difficult in most cases.

Cook County- Cook County does not have an arterial traffic management center, but would like to develop one, initially focused on the area around Schaumburg. Because Cook County and IDOT both operate a number of signal systems there, Cook County continues to express a desire to operate a joint arterial operations center with IDOT. Cook County and Lake County have teamed up to share resources to manage Lake-Cook Road. Lake-Cook Road field equipment is linked to the Lake County Passage TMC. Cook County staff has the ability to communicate with their equipment using Passage as a communication hub. This roadway is important to both Lake and Cook Counties, and both benefit from this arrangement.

DuPage County – A brick and mortar arterial traffic management center does not exist. DuPage County, the City of Naperville, and the City of Aurora and IDOT are cooperating to bring a central signal system to the county. Naperville, Aurora and DuPage County are testing the same TMC software. Instead of developing multiple centers, they may ultimately host the servers and software at a single location and provide all the agencies connections to form a virtual, distributed traffic

management center. In this case, center to center communication isn't an issue because all the signal systems will be connected to a single center.

Kane County - The Kane County arterial traffic management center is under construction. While it was planned to include communication with the Kane County 911 dispatch, they ultimately decided to focus on communication and management of the field equipment first and delay the emergency responder integration. By spring the center should be operational.

Lake County – Jon Nelson received the 2015 National American Public Works Association Engineering and Technology Manager of the Year award. Lake County Passage is the most fully developed of the county TMCs. It includes a central signal system connected to 550 of the 700 signals that operate in the county. Lake County DOT only owns 160 of the total, which is evidence of the interagency cooperation with other operators, especially IDOT. The signal agreement between Lake County and IDOT is viewed as the model for other county agreements. A large number of cameras allow staff to monitor traffic conditions. This TMC is also sharing computer aided dispatch information with most of the local emergency dispatch agencies and information with the Gateway. The TMC provides real time traffic information based on probe data and allows people to sign up for traffic alerts in a number of formats. The communication network is based on a combination of wireless and fiber technology. The TMC is only staffed on weekdays.

McHenry County – A traffic management center does not exist.

Will County - A traffic management center does not exist, but is advocated for by the emergency operations center staff.

City of Chicago - CDOT recently signed a contract to develop their traffic management center. The hardware and communications will be hosted by the Office of Emergency Management. Users of the system will be CDOT staff. They will share video with police and fire.

Naperville – the City of Naperville is testing traffic management software has traffic management capabilities.

Integrated Corridor Management

In general interviewees supported the concept of integrated corridor management (ICM), noting that integrated corridor management can take many forms (managed lane/general purpose lane/transit, general purpose lanes/transit, expressway/interchanges, and expressway/arterial, for some examples). In fact, it was seen as inevitable since conditions on the expressways impact traffic on the arterials, and vice versa, and the technology is available on the market to accomplish it. Technology is not seen as the main impediment to integrated corridor management, however, the need for significant interagency cooperation and policy changes at the cooperating agencies involved would be the more significant barrier.

Thus, developing integrated corridor management policies would be critical, and as part of that the appropriate locations have to be identified. In addition, integrated management could occur all the time or only under certain circumstances. One suggestion was to start small by reviewing signal policies around interstate interchanges. There are some current examples of signal policy set to clear ramps so traffic does not back up onto the mainline. In DuPage County at Army Trail Road, sensors detect queue backups and the traffic lights respond by giving more green time to the ramp. Traffic lights around interchanges could be adjusted to respond to changing conditions, especially those caused by incidents or special events.

Some expressed concern that ICM requires excess arterial and transit capacity to manage and that some areas of the region which experience the most significant expressway congestion and unreliability are also the locations that do not have excess arterial capacity. However, the majority opinion was that there were opportunities for successful integrated corridor management around the region.

The first attempt at integrated corridor management is expected to come when I-290 is under construction. Before that time, ITS investments will be made on North Avenue and Cermak Road. These two roadways are expected to provide some relief for traffic that would normally take I-290. Both of these roadways were independently prioritized as the first “smart corridors” by the Cook-DuPage Smart Corridor Study committee.

Communications

Interviewees commented that in many cases, developing the communication system necessary to support system management was the hardest part of the task. Agencies wished for development of a regional communication plan, and resources to develop and maintain it. A suggestion was made to prioritize communication network development by looking at the locations with the most traffic congestion and information congestion. One interviewee wondered if there was going to be some new kind of communication available that didn’t require fiber installation. Most felt that as long as camera images were being transmitted, only fiber communication would provide adequate capacity to do so.

As in other parts of the transportation system, the communication system must be maintained to be functional. Over time, fiber cables have been damaged by construction, weather and sometimes dirt. The operator is not always aware when this happens. Over time, the functionality of parts of the region’s fiber network has been lost. Much of the network is currently in good condition, but attention to maintenance is important to keep it that way. Some operators are planning to hire consultants to inventory and test the functionality of their own communications. The City of Naperville has avoided construction damage by getting its fiber network on the JULIE location system. If construction is going to take place within a certain distance of its infrastructure, they send out city staff to locate the fiber.

A review of the Gateway role in center to center communications should be undertaken. It seems that some agencies are envisioning direct center to center communication, and others envision communicating through the Gateway. The original concept for the region’s ITS architecture is that center to center communication would take place via the Gateway. Others expressed concern about

whether the Gateway would have the capacity to fulfill the role of communications hub for center to center transportation.

General Statements

System Costs

Use caution when estimating the system costs. Since the costs of technology decline over time, the costs of implementing systems might be over-estimated. On the other hand, you might pay more for new technology that provides more functionality. For example, if you can buy an analogue camera now, it will cost less than the other analogue cameras the operators have already installed. But you would likely not want the analogue camera and would move to newer digital technology. And you also might decide to buy the camera with more functionality, not the base model. In the end, the cost might not be that different or it could be more.

Maintenance

It was widely expressed that the challenge to sustaining management and operations programs comes with agency support of a maintenance and upgrade plans, and agency support of hiring the management and operations staff needed to run the system. Also, that the costs of not modernizing the systems are not appreciated. For example, old signal controllers malfunction more frequently and take more time to fix.

Incident Duration

The duration of the crash investigation is not influenced by the DOT. The DOT can improve detection and verification, provide traffic control, and clearance after the investigation. Each of these provides opportunities for improved performance and reduced duration. The DOT does not have any authority over the procedures or technology used by emergency responders. The DOT also reduces the impact of incidents by preventing crashes through identification and remediation at locations that seem to incur more crashes, and by preventing unsafe conditions that arise infrequently such as in construction zones or at incident locations. Changes to crash investigation procedures are controlled by emergency responders and any procedural changes happen with them.