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Monday 15 August 2005

## Traffic Incident Response Scan April 8-24, 2005

In April of 2005, the Federal Highway Administration (FHWA) and the American Association of State Highway and Transportation Officials (**AASHTO**) sponsored and co-chaired a scanning tour of England, Germany, the Netherlands, and Sweden, for the purpose of studying Traffic Incident Response (TIR) methods in those countries. Members of the scanning tour included representatives from several state departments of transportation, as well as police, fire, EMS, and private sector personnel. Within that group, two relevant organizations were represented: the I-95 Corridor Coalition's Coordinated Incident Management Program Track; and the National Traffic Incident Management Coalition. While a comprehensive analysis is being prepared by FHWA and AASHTO, this summary of best practices and information gathered during this trip focuses on practical applications as they relate to these two organizations, with specific reference to the function of law enforcement involvement in TIR operations, and safety issues related to responding to and managing incident scenes. The privatization of service patrol programs by national automobile clubs also is addressed.

Each country reported significant projected increase in highway usage over the next several years. With the exception of Sweden, which is in the midst of a very ambitious construction program to "ring" Stockholm with an obviously overdue highway and tunnel system over the next dozen years, each country's transportation agency recognized that it could no longer "build its way out of congestion", and that proper management of roadway and personnel resources was necessary to offset the tremendous economic and quality of life issues resulting from congestion. England, Germany, and the Netherlands have each diligently developed plans and practices which leverage the benefits of coordinated Incident Response between transportation agencies, police, fire, EMS and private sector resources.

Authors note: Acronyms may not appear to reflect the English version of agency names, as the acronyms are subject to translation.

## EMERGENCY RESPONSE

Each country visited had considerably unique philosophies on the function of law enforcement for managing traffic incidents. In some cases, these differences may have evolved from historical reactions to specific events, organizational or national culture, or a lack of resources.

### England

The English Program includes a very close working relationship between the Central Motorway Police, the Association of Chief Police Officers (representing the 39 Regional Police departments around England), and the Highway Authority (England's equivalent to FHWA). This relationship, along with the philosophy that the

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police were best serving the public by concentrating on traditional law enforcement issues (speed enforcement and crime fighting), has evolved into the development of a "Traffic Officer" Program, which is managed by the Highway Authority. Following a "Roles and Responsibilities Review" which resulted in the Traffic Management Act of 2004, 1,200 uniformed traffic officers are being hired by the Highway Authority to respond to and manage highway incidents and provide temporary signage, manage road closures, and assist disabled vehicles. These officers will be directed via seven regional control centers, which will be coordinated by the National Traffic Control Center. The Traffic Officers do not provide traditional road service patrol repair and supplies; this is managed by private enterprise covered later in this report. The absorption of duties by the Highway Authority is being phased over time, and will eventually be a fully staffed 24/7 operation at which time the police will "Pull the Plug" on traffic services. It is notable that this program was created thru a distinct partnership between the Highway Authority and the Association of Chief Police Officers. Once the police are on the scene, however, it was made clear that they are in charge of the Incident Response, and that Traffic Officers, as well as Fire and EMS responders, take direction from the Police Officer in charge. The Fire Service's mission at highway incidents is to "make the scene safe" under the direction of the police.

[click image to enlarge](#)



The management of Towing and Recovery response is complicated for police agencies in England; in a highly regulated area, legal interpretations vary from place to place. Two types of recovery exist: Statutory, where the vehicle is abandoned, is an obstruction, or is in an otherwise dangerous place; and Non Statutory, covering all other situations. Rates, protocols, and liability are affected by these designations, which can vary by region, and the local police may act as an intermediary in fee collection. The Police are attempting to secure legislation to streamline the process of removal, storage, and disposal of vehicles left on the highway.

[click image to enlarge](#)



It was repeatedly reinforced that the Highway Authority operates its network, while the police focus on law enforcement, and that both disciplines believe that this configuration enhances safety while improving service. Initial analysis of the first phase of this program has shown a measurable reduction of impact related to incidents, improved on-scene safety, and positive feedback from the public. It also has fostered better relationships between the Highway Authority and the Police. Additionally, the police report that, as a result of being released from handling minor traffic incidents, they are experiencing greater visibility and higher ticket and arrest statistics. The “Killed or Seriously Injured” (KSI) rate has been reduced by 24%. There are still some counterproductive protocols with regard to investigating fatal automobile accidents: each fatal accident is investigated as a homicide investigation, often with total roadway closure for periods of eight hours or more. The emphasis in the U.K. appears to be more toward diversion routing rather than quick clearance. As in the U.S., bureaucracy, regulation, and threat of litigation hamper efforts to improve network management in this area. A recent snowstorm, during which motorists were stranded in their vehicles in excess of 12 hours without relief, has served as a catalyst toward forcing necessary regulatory change in current practices. As the British are expecting a 40% increase in traffic volume over the next 20 years, they recognize the need to maximize their efficiency in managing incidents efficiently.

[click image to enlarge](#)



Both the Police and the Highway Authority utilize new technologies to achieve their collective mission in several innovative ways. Collaboration on determining “Casualty Cluster Sites” leads to light overhead sign gantries to facilitate variable speed and lane usage

designations, as well as electronic speed enforcement cameras. These locations are clearly identified to the public, with an emphasis on modifying driver behavior rather than generating revenue. The use of Automatic Number Plate Readers (ANPR) allow police to monitor passing license plates for active warrants, stolen or uninsured vehicles, or suspended registrations. "Hits" on the system cause an alarm to register at police headquarters. This generates a response from area patrols which have been freed up by the Traffic Officers' handling of minor incidents. The City of London is surrounded by these readers, and is referred to as the ANPR "Ring of Steel", aiding in counterterrorism efforts as well as basic criminal detection. (Subsequent research indicates that the U.S. license plate system would be able to utilize this technology, even though plates differ from state to state. The system is able to "learn" the different styles of plates based on color, font type and size and other characteristics; and then discern between states.)

## Germany

The German program is significantly different than the British and the Swedish programs in several ways, most notably in that the Transportation Departments are not involved in Incident Response. The police operate the transportation system with regard to Incident Management, and are responsible for Traveler Information and Recovery Operations. Many Incident Management functions have been privatized through Automobile Clubs, including some EMS and air ambulance services, as well as certain traveler information systems, telematics, and road service patrols. The Police maintain control over VMS messages, and manage contracts with towing and recovery firms. They also maintain a relationship with the Red Cross for assisting with providing relief to motorists stuck in protracted closures.

[click image to enlarge](#)



Germany is divided up into 16 "Länders" (similar to states), and each has its own uniformed police force responsible for highway patrol. The Germans are very rigid in their requirements related to response time: German law mandates that emergency personnel respond to incidents within 8-12 minutes (depending on the service) 90% of the time. Doctors ride with Paramedics, and are required to be on scene within eight minutes of incident detection. The issue of "who's in charge" at the accident scene did not seem to be a problem; the Police are in charge of overall incident operations, while the fire service makes all necessary decisions related to safely securing the scene and protecting emergency personnel during firefighting and extrication. Notably, the use of volunteer responders is widespread. There are over 1.1 million volunteer firefighters in Germany (volunteerism is compulsory in lieu of military service). Easing congestion of responders at incidents are the regulations that firefighters and EMS workers cannot drive to

the scene in their personal vehicles, do not have personally owned emergency lights, and must respond from the fire house or designated staging area. As many volunteers respond from work, employers are compensated by the community for lost productivity due to firefighting duties.

[click image to enlarge](#)



The German Police utilize special equipment and tactics to efficiently and safely manage incident scenes. Their vehicles are equipped with reflective traffic cones, folding signs, and blinking lights. The vehicles also have reflective markings on them which, when angled properly, “point” traffic in the direction the police want motorists to travel as they proceed around the incident. It was noted that parking the emergency vehicle at an angle prevents motorists who are approaching from the rear from misjudging whether the emergency vehicle is moving. Dispatch protocols include sending secondary responders to the rear of the traffic queue. Though an executive order regarding delay management places responsibility at the hands of the Highway Authority, the functional responsibility for managing delay at incident scenes is entirely that of the police. Similarly, the police have written orders regarding quick clearance and maintain a sense of urgency at incident scenes to get the road open as expeditiously as possible.

## Netherlands

The Dutch Authorities have twice traveled to the United States to study Incident Management and Response, and claim to have taken the best from what they observed and have deployed these practices in the Netherlands. This statement can truly be taken as a compliment to United States’ practices, for what was observed in the Netherlands was certainly the most comprehensive and well blended Incident Response program on the tour. Probably the most notable aspect of the Dutch program was the uniformity of response between disciplines. Police, Fire, EMS, (privatized) Service Patrol, and even Towing and Recovery agents are all trained by a National Traffic and Information Management Center program to ensure uniformity in the “handling of calamitous situations.” Responding personnel make up an Incident Management “Coordination Team.” Team members all have generic duties with regard to securing an incident scene, based upon their order of arrival rather than their individual discipline. This philosophy insures that each incident is secured, triaged, and managed exactly the same way, regardless of who gets there first.

[click image to enlarge](#)



Training testing area

In this “Team” concept, the discipline which is ultimately in charge is determined case by case, depending on the dynamics of the situation. The Dutch were very aware of the necessity of partnerships between the Highway Authority and emergency service agencies, and noted that the Authority sends a representative to significant incidents to monitor the effects that the management/recovery effort has on traffic. The Dutch also were quite aware of the “Quick Clearance” concept, stating that the government’s focus was on clearing the highway, not saving the load. They are working with trucking and insurance industries toward generating an understanding of costs related to unnecessary congestion. There is an entity in the Netherlands sponsored by the insurance industry, the “Salvage Transport Institute,” which currently sends representatives to incident scenes in an attempt to minimize the effect of recovery on the equipment and cargo involved. The ongoing evolution of managing this conflict should be worth tracking for our own Quick Clearance issues.

 [click image to enlarge](#)



The Dutch Highway Authority operates a National “Test Center for Traffic Systems” for the purpose of establishing nationwide uniformity in developing ITS systems and response techniques. The authority has identified the issues caused by having multiple traffic centers across the country, each operating different systems. The Test Center also serves as a “National Training Institution” for highway traffic control, producing a training and certification process for TMC/TOC operators. This hi-tech facility supports comprehensive simulation training for operators and responders.

## Sweden

The Swedish Incident Response program examined on this scanning tour was focused primarily on the tunnel system within the city of Stockholm, and particularly on the most recently opened tunnel -- the Soder-Lanken, or South Link Tunnel -- and the partially completed ring road around the city. The Swedes acknowledged that the costs of congestion in Sweden were significant, and

claimed that incident-based congestion costs their economy the equivalent of \$300 million U.S. dollars annually. In Sweden, it appears that the fire services are primarily in control at incident scenes, and it is the Fire Department which coordinates the efforts of Service Patrols during the Incident Management process.

[click image to enlarge](#)



The Swedish Road Authority noted that it had the legislated authority to close and open roads without waiting for the police to respond, and that most on-scene management was the function of Fire, EMS, the Road Authority and contracted towers. Fire services claimed to maintain a philosophy of trying to keep a lane open, and stated that law enforcement tends to keep the roadway closed for investigative purposes. It is the responsibility of the fire officer in charge to coordinate the other disciplines at the scenes and to communicate to the media. The Swedes engaged in the unique practice of emailing incident scene/victim photos taken with cellular phones to trauma centers prior to EMS' departure from the scene. The Road Authority stated that incident scene video, when available, was sent to police and fire departments for the purpose of promoting quick decisions about opening lanes. The penetration of CCTV in Sweden is significant; they are currently operating 451 cameras and have immediate plans to bring that number to 700, with 100% coverage in the tunnels around Stockholm.

[click image to enlarge](#)



Although a representative from Law Enforcement was briefly present during our visit, that representative did not make a presentation or discuss Incident Management procedures.

## SAFETY

The Dutch Police have identified a desired performance measurement of a 50% reduction in fatality rates by 2010, from peak statistics experienced in 1986. Their focus will be on enforcement and education, with intensive use of mobile video to capture speed violations, seatbelt usage, and drugged and drunk driving, as well as to assist with behavior modification of the aggressive driver. They pointed out that, similar to the United States, there are more than 40,000 European highway fatalities annually. In addressing safety at the incident scene, the Dutch have a remarkable program called "IM+" which leverages the benefits of interdisciplinary partnerships and uniform training to deliver a "safer and faster" Incident Response theme. This is accomplished through the execution of a "Safety Order of Priorities" which identifies required safety practices for all responders. These are listed as:

- 1- Manage your own safety first – safe response, proper positioning and lighting, reflective garments, working only in designated "safe" zones.
- 2- Traffic Safety – providing a clear message to approaching traffic to direct flow.
- 3- Rescue of accident victims or stranded motorists.
- 4- Salvage of cargo or vehicles.

A key directive for all responders was the requirement of a 100-meter buffer between the rearmost/first vehicle to respond and the accident scene itself. There also is a similar requirement to maintain a one-meter "risk zone" buffer between the work area and the nearest open travel lane. As part of the National Incident Response Training Program, these requirements reinforce the philosophy that before responders can help an incident victim, they must first protect themselves and approaching traffic, and only then may they address the incident. The first vehicle on the scene, whether it is a tow truck, ambulance, service patrol, fire truck, or police car, will stop 100 meters from the incident, and park in a "fend off" position using the vehicle's highly reflective arrow-like side markings to point oncoming traffic in the direction where passing vehicles should go. In the Netherlands, each discipline's presenter reiterated these priorities, associated philosophies, and techniques, which clearly exhibited that these practices are in fact in place.

The Dutch have completed secondary accident research and have produced a simulation to guide placement of personnel and vehicles to minimize the consequence of secondary crashes to the incident responders. Some of the resulting practices include providing reflective vests to accident victims and disabled motorists, placement of vehicle occupants behind a guide rail, and minimizing the confusion to approaching traffic by requiring that only the rearmost vehicle operate its emergency flashing lights once all responders have arrived and are in place.

At the National Institute for Fire Service and Disaster Management (NIBRA) in Arnhem, Netherlands, fire services were also being trained in the above practices. At this center, a critical issue related to responder safety was presented regarding the dangers fire and rescue personnel face with newer, high-technology vehicles. Front and side airbags, high voltage hybrid batteries, and reinforced steel cages are collectively posing an increased risk to rescue personnel while simultaneously hampering the recovery efforts. A program was discussed in which vehicle blueprints could be made available

to rescue service via wireless tablet computers linked to vehicle databases. This proposed system indicates in detail the location of reinforcing steel, carbon dioxide canisters for airbags, high voltage batteries, cables, and liquid propane canisters for hybrid vehicles.

For the Towing and Recovery industry, the Dutch have legislated requirements for color and reflective striping of tow vehicles and have mandatory requirements for personal safety attire and on-scene safety procedure training.

While emergency responder attire varied from country to country regarding color or discipline designation, it was consistently observed that there were no emergency responders of any discipline in any of the four countries visited that did not wear highly reflective, brightly colored outer garments when working on the highway.

In Sweden, it was noted that modifying driver behavior is a major initiative toward making Stockholm's streets and highways safer. The Swedes have a "zero fatality" goal for their highway safety program. They noted that a considerable number (1 in 5) of their highway fatalities was alcohol-related. They also considered speed to be a major contributing factor. Speed enforcement cameras have been tested on two occasions, yielding a total of 560 traffic summonses. A product that has been tested is soon to be mandatory equipment on new vehicles sold in Sweden; this device attaches to the vehicle's accelerator pedal, and either vibrates or creates resistance when the vehicle is exceeding the speed limit. The vehicle is connected to a GPS system, which monitors the vehicle's location and is linked to a highway speed limit database.

## SERVICE PATROLS

In England, Germany, and the Netherlands, the service patrol programs were provided by automobile clubs. Membership in an auto club tends to cost about \$70-\$100 U.S. annually, which is a fraction of what an ordinary tow charge would be. The auto clubs provide road patrols, which have similar penetration and response time expectations as service patrols in the United States.

In England, the Royal Auto Club (RAC) operates 1500 patrols across England, and these patrols are dispatched from a state of the art call center in Bescot. This center boasts a call volume of 700 calls per hour at peak periods, 4.5 million calls annually; 85% of incoming telephone calls are answered within 10 seconds. In addition to their 1500 patrols, there are 100 "branded" patrols serving specific vehicle brands through contracts with individual automobile manufacturers. Each patrol is equipped with a mobile data terminal, with automatic vehicle identification transmitters, linked to a computer aided dispatch system at the dispatch center. The vehicles are also equipped with computer diagnostic equipment which can plug into and diagnose the disabled vehicle's malfunction. They have an average response time of 40 minutes. The RAC maintains contracts with 350 towing contractors, and has agreements with 500 additional tow vendors for back up. RAC Operators work closely with Highway Authority Traffic Officers, and have developed best practices for providing their service through cooperative training with their competitors and the Police. Although safety practices are trained upon hiring, and in ongoing in service training, the RAC experiences approximately two to three driver fatalities annually, with six recorded in 1998.

In Germany, the ADAC Automobile Club operates 1700 vehicles nationally, employing certified mechanics in all of its vehicles. They claim to have 50 million members and have affiliations with over

1100 towing and recovery contractors. ADAC drivers strive for a 35 minute response time, and have an actual average response rate of 38 minutes. They claim that of the 3.6 million “jobs” they respond to annually, 86% are fixed on the spot. ADAC also provides several other services for its members, including air ambulance, auto inspections, traffic information services, and in-vehicle “mayday” telematics systems. Despite highly reflective vehicles and brightly colored uniforms, the ADAC staff experience one to two fatalities annually.

The Royal Dutch Touring Organization (ANWB) operates 1100 road patrols from a modern facility in Wolfheze. While similar to the German and English programs, the Dutch program appears to integrate the overall interdisciplinary Incident Response protocols. Their core business is responding to vehicle breakdowns, and their computer aided dispatch system has a unique bar graph method for tracking incoming calls, calls waiting to be dispatched, and dispatched calls pending arrival. These graphs were compared with a graph showing status of on duty road patrols (available, en route, on scene). ANWB employees undergo the same training that other Dutch emergency responders have regarding vehicle positioning and incident scene safety. The ANWB offers its members a trauma helicopter service, and it also owns several towing and recovery companies throughout the Netherlands.

The Swedish program was funded and operated by the Highway Authority. The program appeared to function primarily to respond to incidents within the tunnel system. They have the services of a private towing contractor integrated into their response plans, and claim a five minute average response time to disabled motorists or incidents. Program vehicles, by legislation, have been declared emergency vehicles. In addition to being dispatched via a mobile data computer, they also monitor the highway police radio system. The road assistance program has a heavy incident response vehicle in its fleet, equipped with a crash attenuator, arrow board, changeable message sign, and a light crane.

Another unique practice of the Highway Authority motorist assistance program was the utilization of a motorcycle with a collapsible trailer for the purpose of cutting through stopped traffic to reach disabled motorists. Upon arrival, the trailer unfolds, and is capable of towing motor vehicles from the travel lane thereby opening lanes of traffic. It was pointed out that oftentimes tow vehicles are dispatched to a scene but can’t reach their destination due to the congestion that results from the need for a tow.

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### **Summary of Potential Action Items for the I-95 Corridor Coalition and the National Traffic Incident Management Coalition:**

1- Identification of emergency vehicle response procedures best practices (coordination and appropriate response levels, vehicle markings, vehicle positioning, lane closure protocol, and emergency lighting discipline) and recommending a process for standardization. This would require a consensus from each discipline, and the development of an implementation plan utilizing a “field operational test” format. The NTIMC should consider investigating the potential for legislative changes or leveraging NIMS mandates. Guidelines for state legislative changes should be considered.

2- Interdisciplinary incident scene safety training – Develop a “Safety Order of Priorities” similar to the Netherlands model.

3- Recommending requirements and identifying a process for certification of private incident responders – Towing, service patrols, and private ambulance organizations.

4- Development of a business case for automobile club ownership and management of service patrol programs.

5- Standardized responder apparel and developing an integration plan to facilitate usage by public safety personnel..

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## Appendix

### Site Visits

England

Royal Auto Club (RAC) Control Centre, Bescot  
National Traffic Control Centre, Quinton

Germany

German Academy for Crisis Management (AKNZ), Ahrweiler  
German Research Institute (BAST), Bergisch-Gladbach,  
Central Fire Dept Headquarter, Cologne

Netherlands

Offices of Traffic Mgmt Center, Delft  
ANWB Dispatch Centre – Wolfheze  
Netherlands Institute for Fire Service and Disaster Management (NIBRA), Arnhem

Sweden

South Link Underground Motorway  
Trafik Stockholm Center

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