Arizona Traffic Incident Management (TIM) Past - Present - Future

2019 Arizona ITE/IMSA Spring Conference

Session 1A – Traffic Incident Management

February 28, 2019 – 10:30 to 12:00

ARIZONA ITE-IMSA Annual Spring Conference

Moderator: Mr. Jeff King
FHWA Arizona Division
Safety Specialist

FHWA Vision for TIM

Better TIM programs & training will result in:

- ***Safe clearance*** of the Nation's roadways,
- ***Reduction of the risk of death or injury*** to responders or motorists, including reduction of secondary incidents
- ***Rapid clearance of incidents***, reducing the impact on congestion & the potential for secondary crashes
- Clearly ***defined responder roles*** & better ***use of resources***
- TIM being a ***"core mission"*** among transportation, law enforcement, fire/rescue, EMS, Towing, etc.
  - ***In turn, multi-disciplinary approach to resources invested in the program***

Sharing the AZ TIM Program, its progress and where it is going are:

- Captain John Paul (JP) Cartier

  AZ. Dept of Public Safety
- Mr. Derek Arnson

  AZ. Dept. of Transportation
- Mr. Mark Brown

  Maricopa Dept. of Transportation
- Ms. Angela Barnett

  AZ. Professional Towing and Recovery Assn.

TIM: History of the AZ TIM Program

Captain John Paul (JP) Cartier
AZ. Dept of Public Safety



ARIZONA'S TRAFFIC INCIDENT MANAGEMENT (TIM) PROGRAM

What is Traffic Incident Management?

- TIM consists of a planned and coordinated multidisciplinary process to detect, respond to, and clear traffic incidents so that traffic flow may be restored as safely and quickly as possible.

- Effective TIM reduces the **duration** and **impacts** of traffic incidents and **improves the safety** of motorists, crash victims, and emergency responders.

THE CATALYST

Major Incident

- Sunday, August 9, 1998
- Southbound, Interstate 17, Sunset Point
- Multiple vehicle fatality crash
- Full roadway closure
- 60 mile traffic backup
- 6 hour delays
- Mid-summer heat



THE ANALYSIS

Responders

- professional, adhered to agency policies and procedures
- deployed all available resources and personnel

Media

- closely scrutinized procedures due to extensive traffic backup and delays

Key Impacts

- Arizona's large population growth
- Increased congestion
- Increased number of crashes and major incidents



THE RESPONSE

August 20, 1998 – Traffic Action Plan announced by the Governor's Office

- **Multi-agency incident management training**
- **ADOT installs DMS signs throughout the state**
- **AZDPS to use techniques and technologies to reduce felony and fatal collision investigations**
- **ADOT / DPS complete an IGA outlining incident management goals**
- **Alternate route plan established**

ARIZONA TIM - EVERYDAY INCIDENTS





"2010 Focused Effort"

Responders should practice TIM principles daily when implementing response strategies to minor, intermediate, and major incidents.

2010 - AZTECH TIM COALITION

- Regional multi-disciplinary traffic management partnership
- Established in 2010
- Includes
  - Law enforcement
  - Fire
  - EMS
  - Towing association / companies
  - Transportation agencies and metropolitan planning organizations
- Shares ideas, knowledge, lessons learned and best practices



AZTECH TIM COALITION

Goals and Values

- Collaboration
- Leadership
- Integration
- Results



AZTECH TIM COALITION

Overview

- Meets every other month
- Debrief traffic incidents
- Review/analyze/reduce Secondary Crashes
- Advance Action Plan Projects
- Advance TIM Training



AZTECH TIM COALITION

TIM Action Plan Projects

- Outreach and engagement
- Customize TIM training
- Improve TIM training tracking and reporting
- TIM mentorship program
- TIM training program metrics





Traffic Incident Management - TIM

Each injury crash can require…

- **2 Law Enforcement**
- **4 Fire/Rescue**
- **2 EMS**
- **1 Towing & Recovery**

–

= 9 Responders



FIRST RESPONDER PROFESSIONALS

- 2017 Statewide Collision Stats
- 127,064 Collisions
- 37,823 Injury Collisions
- 919 Fatal Collisions
- 3,052 Secondary Collisions
- 1,053 Secondary Collision Injuries
- 12 Secondary Collision Fatalities
- Approximately 348,678 Arizona Responders Working In/Around Traffic in 2017

AZDPS Policies / State Legislation Supporting TIM

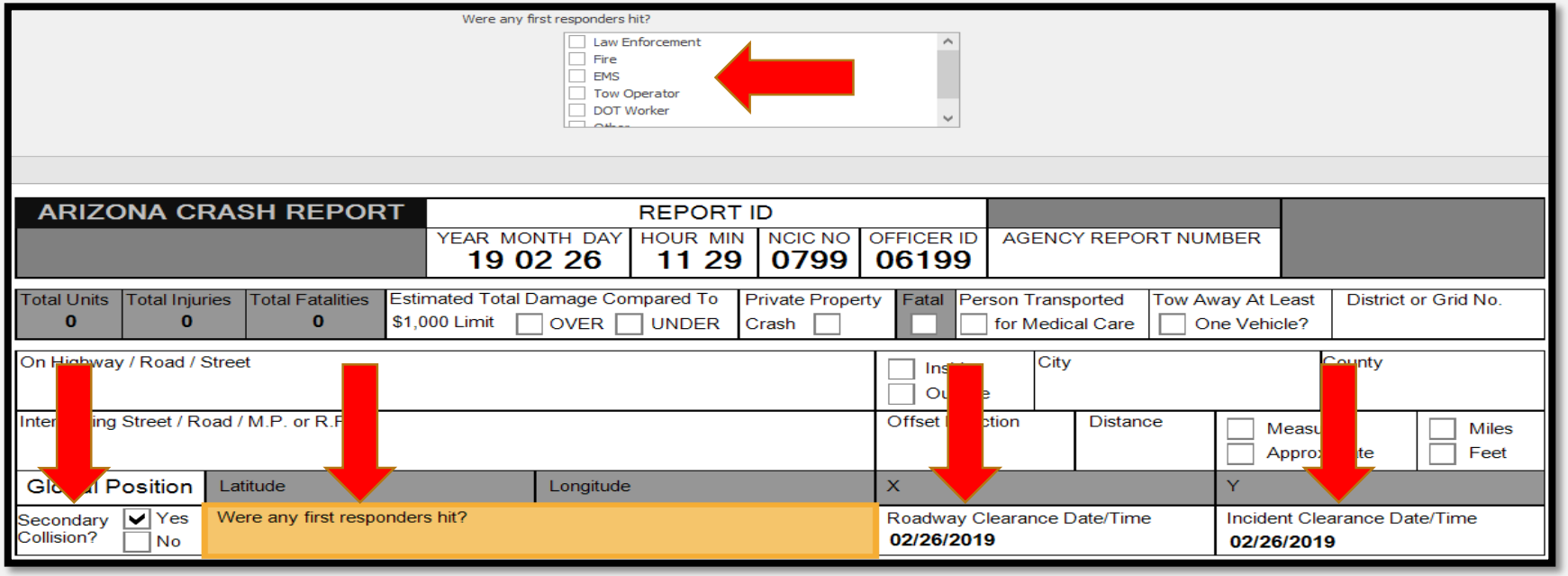
- HPD Order 1.01 – Priorities – Active Traffic Management
- HPD Order 2.12 – Pushing Disabled Vehicles
- HPD Order 2.35 – Collision Scene Management
- HPD Order 2.44 – Traffic Control (Visibility and Apparel)
- HPD Order 2.60 – Traffic Stop and Incident Procedures
- Highway Operations Manual
- General Order 4.2.10 - Vehicle Removal
- **ARS 28-674 – Traffic Accidents; Quick Clearance**
- **ARS 28-775.E.1,2 – Move Over Law**
- DPS Tow Service Agreements Require towers complete TIM training within 3 months



TIM Data Collection

Traffic and Criminal Software (TraCS) - 2010, 2014, 2018 "Milestones"

- Public Safety Data Collection Software
- Used by Troopers to Electronically Document Collision Reports, Enforcement Actions, Vehicle Tows, Supplemental Forms, etc.
- Downloaded Daily to Arizona Department of Transportation
- Captures TIM Performance Measures



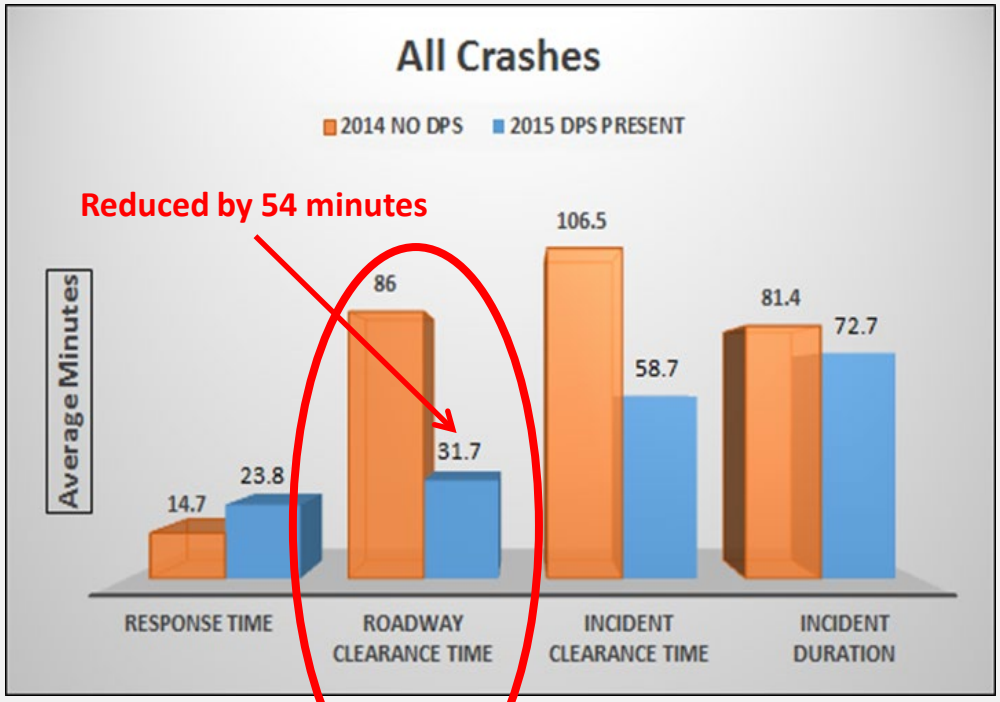
TIM PERFORMANCE MEASURES – COLLECTED STATEWIDE

- **Roadway Clearance Time = Time Blockage Reopened** - "Time Blockage Reopened" is when collision debris and/or vehicles have been removed from the lanes of traffic. (actual time, not duration).
- **Incident Clearance Time = Time Off Highway** - When all patrol, collision vehicles or major debris are removed from the view of traffic, includes tow trucks and fire. When the collision is no longer causing a visual distraction to traffic, usually vehicles parked on an on or off ramp would not be considered a distraction. Does not include follow-up off highway at the hospital or other locations, (actual time, not duration).
- **Secondary Collision** - A secondary collision is defined as a crash within an incident scene or within a traffic queue resulting from an original incident. The original incident does not have to be a collision, could be a disabled motorist, vehicles on the side of the road, or any other unusual circumstance related to traffic backup or change in traffic flow such as unusual construction backups; as long as it played a roll in distracting the driver or the causation in the collision. If the queue is a normal, every day occurrence without an original incident then a crash may not be secondary, this is a grey area. Any crash involving a first responder (LE, Fire, EMS, ADOT, or Towing) in route to a crash, regardless of location, is considered secondary.

2014 - TRAFFIC OPERATIONS CENTER (TOC) CO-LOCATION PROGRAM GOALS

- Improve public and responder safety by managing traffic incidents and mobilizing effective emergency and investigative responses, road clearance and traffic diversion assets.
- Use Traffic Incident Management (TIM) concepts to reduce response times, clearance times, secondary collisions and congestion.
- Use performance metrics to evaluate the impact of the co-location pilot program and report the results.

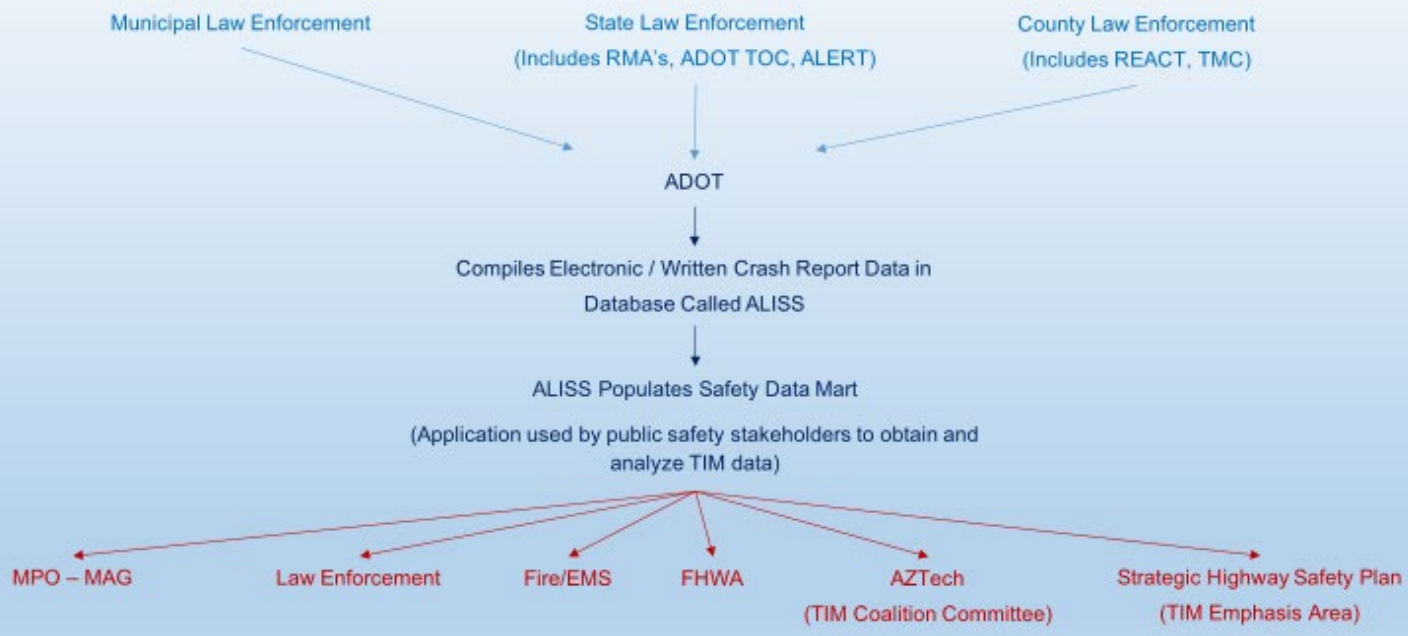
TOC, TIM & PATROL LEADERSHIP IMPACT
ALL FREEWAY CRASHES



Comparison:
2014(Jan–Sept)
NO DPS
Vs
2015 (Jan-Sept)
DPS Present

+62% **-63%** **-45%** **-11%**

Arizona TIM Data Collection



ARIZONA'S TIM PROGRAM

Collaborative Approach/Outcomes

- Collect/Analyze/Apply TIM Data
- Develop 4 E's - Engineering, Education, Enforcement, EMS Strategies and Goals
- Improves Responder / Public Safety
- Improves Communications
- Safe Quick Clearance
- Institutionalize TIM Strategies, Training, Practices



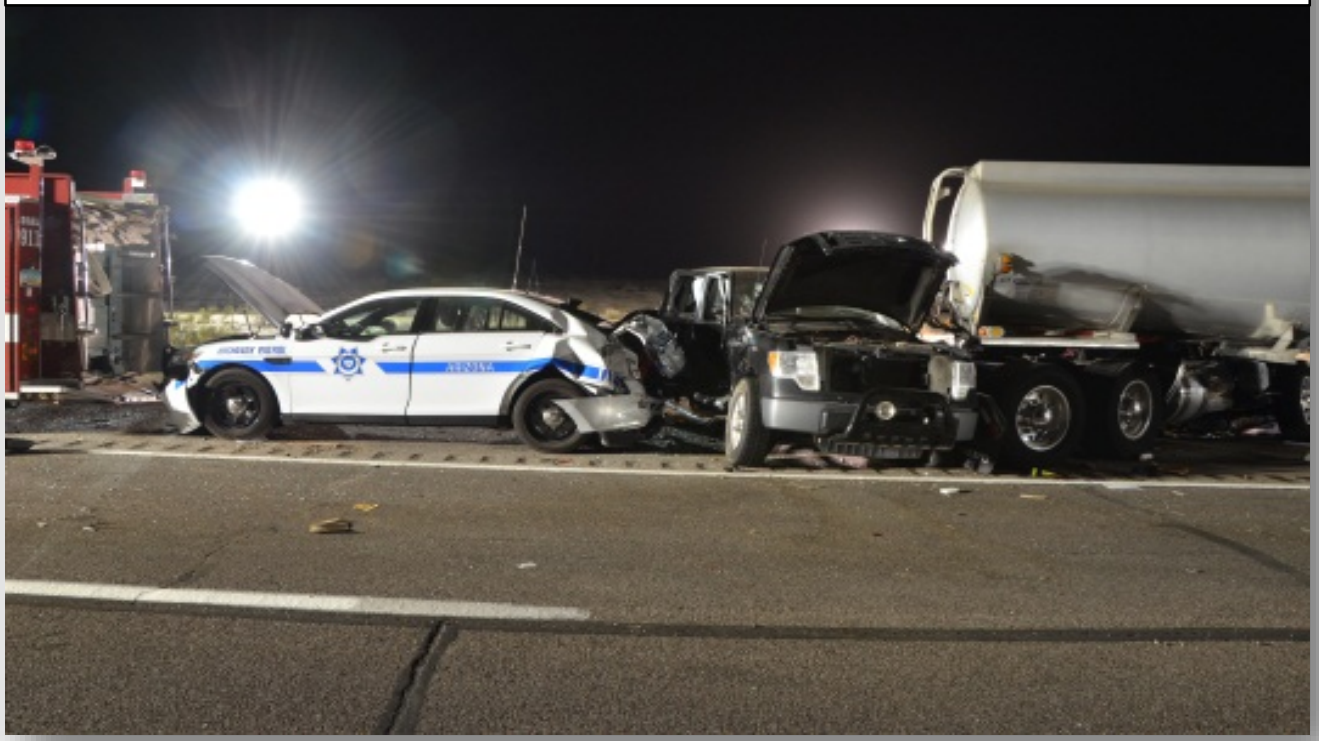
THE FALLEN REMEMBERED

Arizona DPS has lost 30 state troopers in the line of duty;

17 of these were involved in motor vehicle crashes, 11 were involved in secondary crashes



Trooper Tim Huffman Secondary Collision



Trooper Tim Huffman Secondary Collision



ARIZONA DEPARTMENT OF PUBLIC SAFETY

THANK YOU

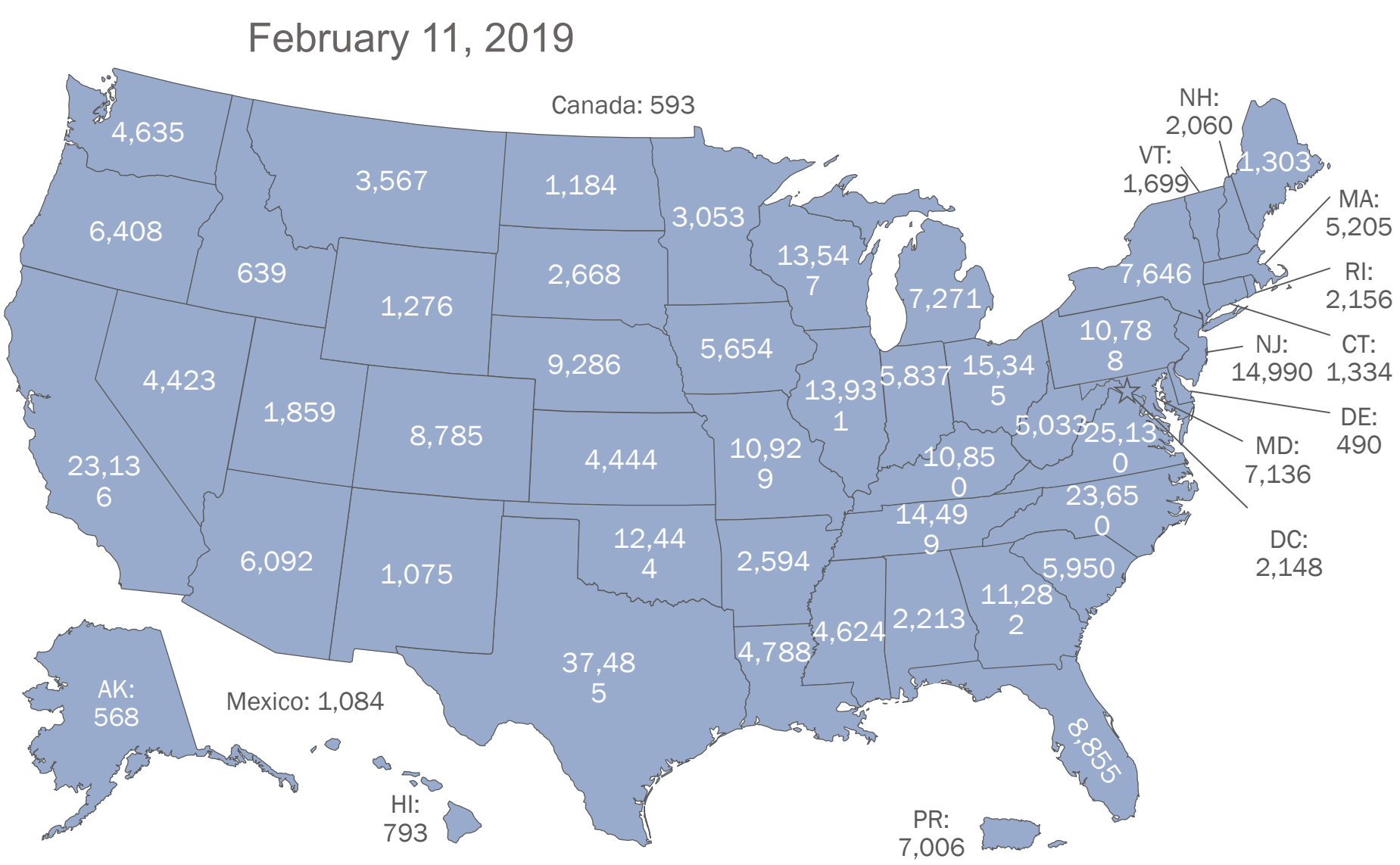


TIM: Training and Research

Mr. Derek Arnson
AZ. Dept. of Transportation

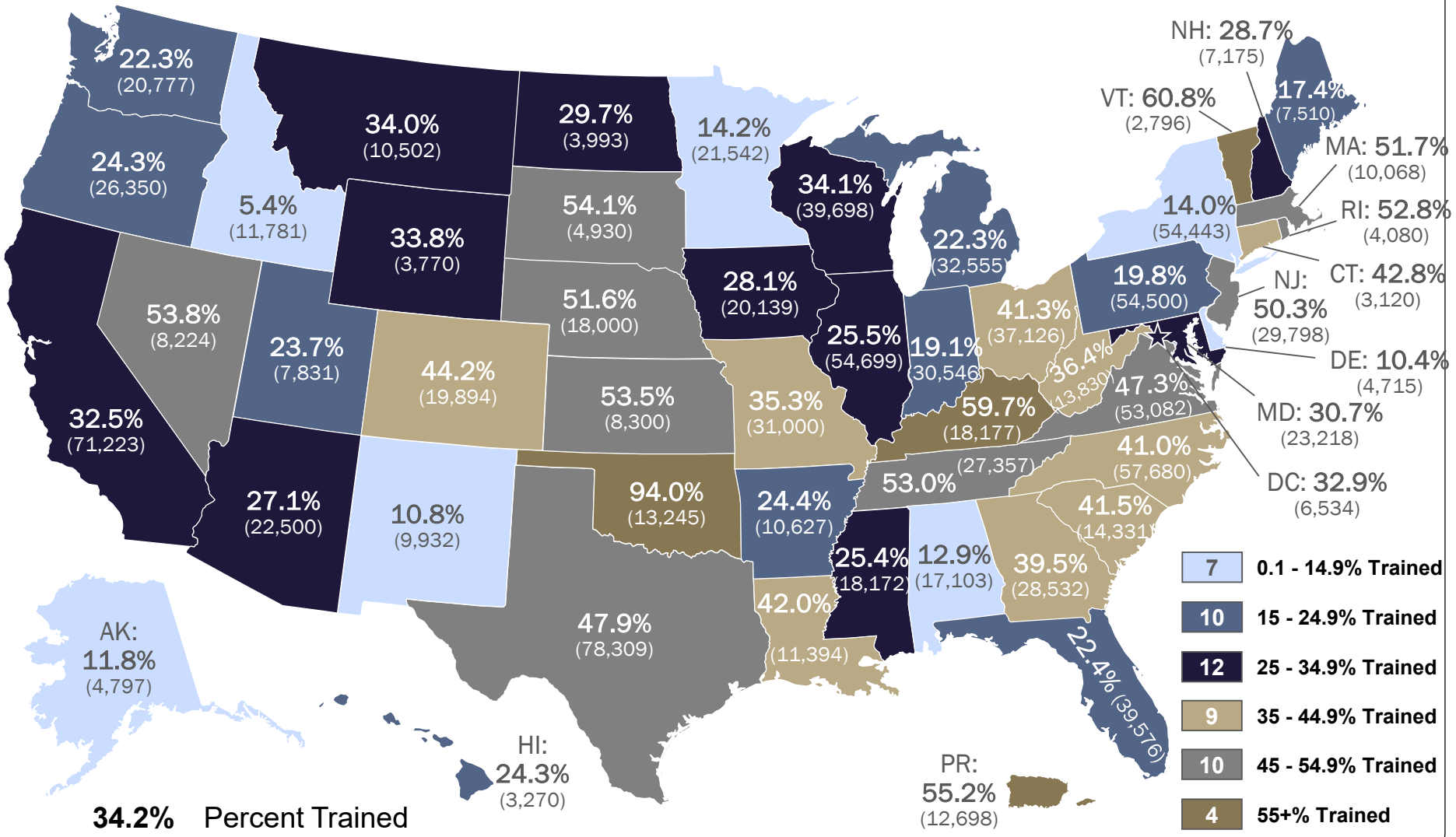
TIM: Training

- The Traffic Incident Management Training was developed out of the SHRP2 research program and delivery began in 2012.
- While the training was piloted in a few states in 2011, Arizona held the first production version of the 12 hour National Train the Trainer session.
- This Training prepared 74 AZ TIM instructors to begin instruction the 4 hour block of TIM training to our incident responders.
- Since that time AZ has held 7 additional Train the Trainer sessions and has 309 trained instructors of which approximately 70 active trainers.



391,440 Total Trained

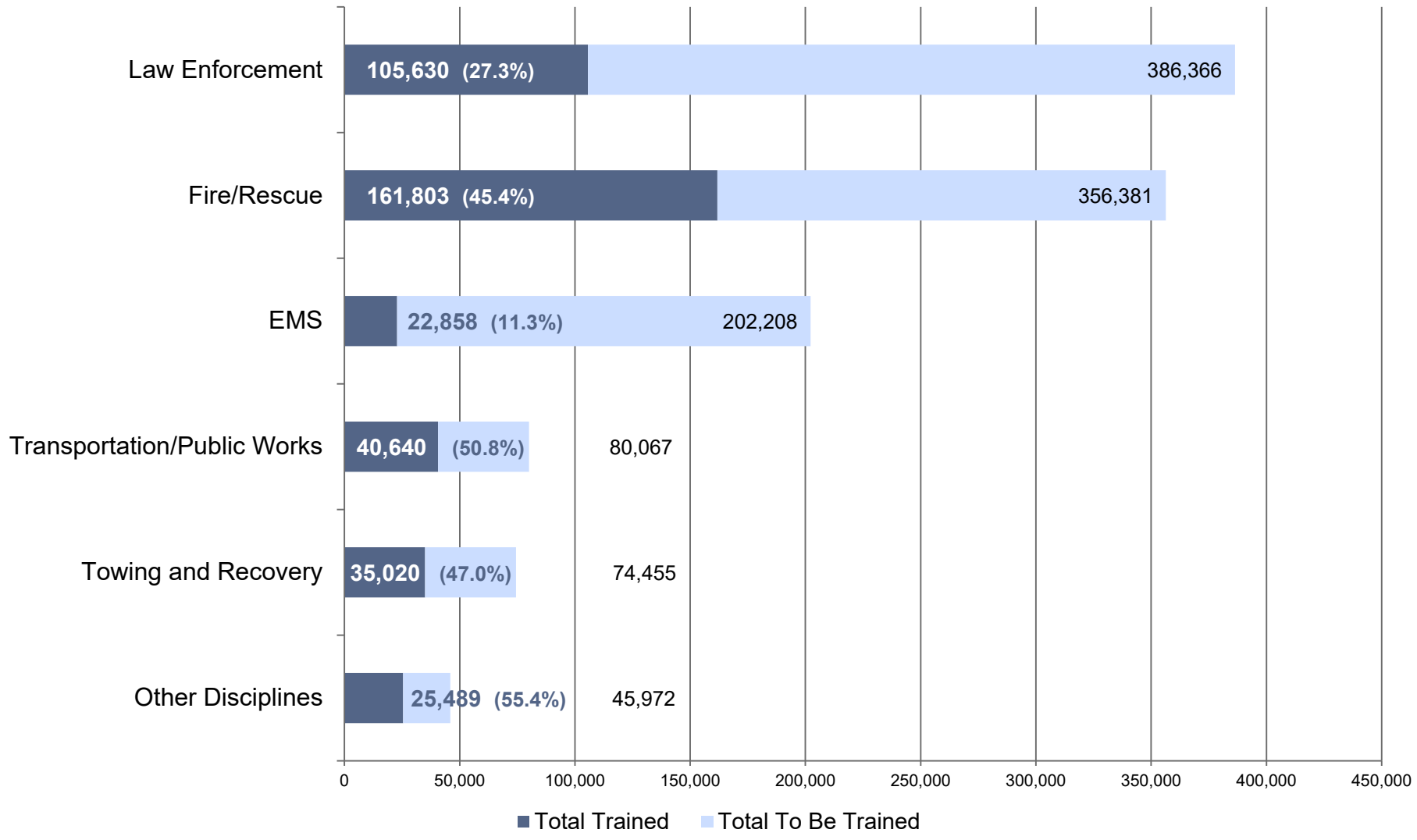
February 11, 2019



34.2% Percent Trained

(1,145,449) Total Responders To Be Trained

February 11, 2019



** The NHI WBT total for the time period between 10/01/14 and 09/30/16 is reported as "Other Disciplines"*

Does the Training Work?

- In late 2015 USDOT, Volpe National Transportation Systems Center, Office of research embarked on a project to determine just that.
  - Using crash data from states (AZ & TN) collecting the TIM Performance data and training records they scientifically concluded when and where the SHRP2 TIM training was conducted:
    - Incident clearance times were reduced
    - Roadway clearance times were reduced
    - Secondary collisions involving responders was reduced
  - *SHRP2 Traffic Incident Management Responder Training Program*, Published Sept. 2018, FHWA-HRT-18-038.

https://www.fhwa.dot.gov/publications/research/randt/evaluations/18038/18038.pdf

Performance Measures Dashboard

- This was a project that was initiated by the FHWA EDC 4 innovation "Using Data to Improve TIM."
  - The research team developed a performance measures Dashboard using the AZ Data as an example.
  - Initially the data was feed into the dashboard from an excel table for demonstration purposes.
  - The data in a production environment can be feed into the dashboard using the same XML stream that agencies use to sent their crash reports to ADOT which contains the TIM data.

Out comes from that research:

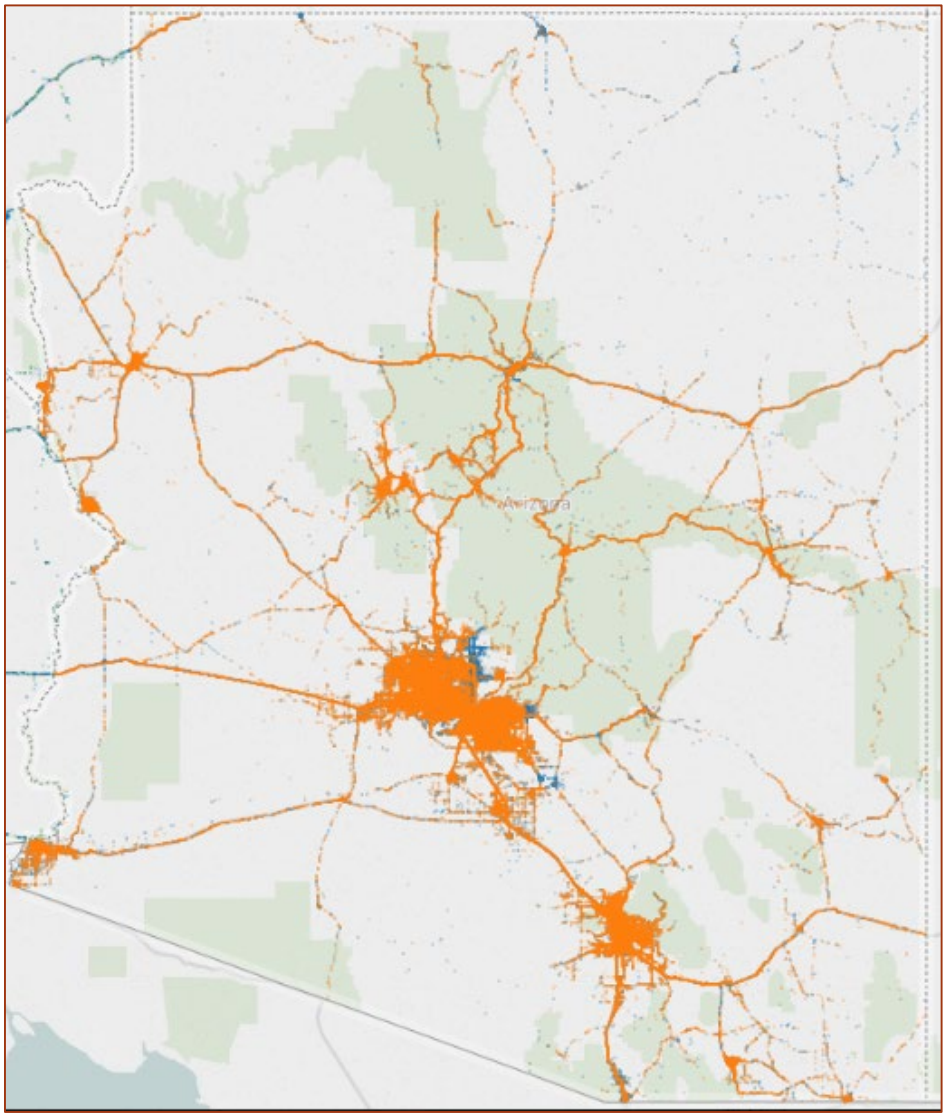
- Review Arizona crash data in the prototype TIM PM Database and Dashboards
  - ADOT provided a multiple-year data dump to AEM (research contractor)
  - AEM added the data to the "national" database and ran some analyses
- Review the state of practice in collecting TIM PMs statewide
- Review/discuss data quality using Quality Dashboard
- Review/discuss TIM PMs using TIM PM Dashboard

TIM PM Database – Arizona Crashes

- Four years of crash data from Jan 2014 – Dec 2017
- Significant density along metropolitan regions and major highways

Measures Available

- Full
- None
- Partial



TIM PM Completeness 2015-2017

Percent "Full" Collection of RCT and ICT

Agency Type	2015	2016	2017
DPS	89% (29,251)	100% (34,937)	100% (35,911)
Non-DPS	52% (42,042)	70% (61,045)	74.4% (68,168)

TIM PM Completeness by Agency (2017)

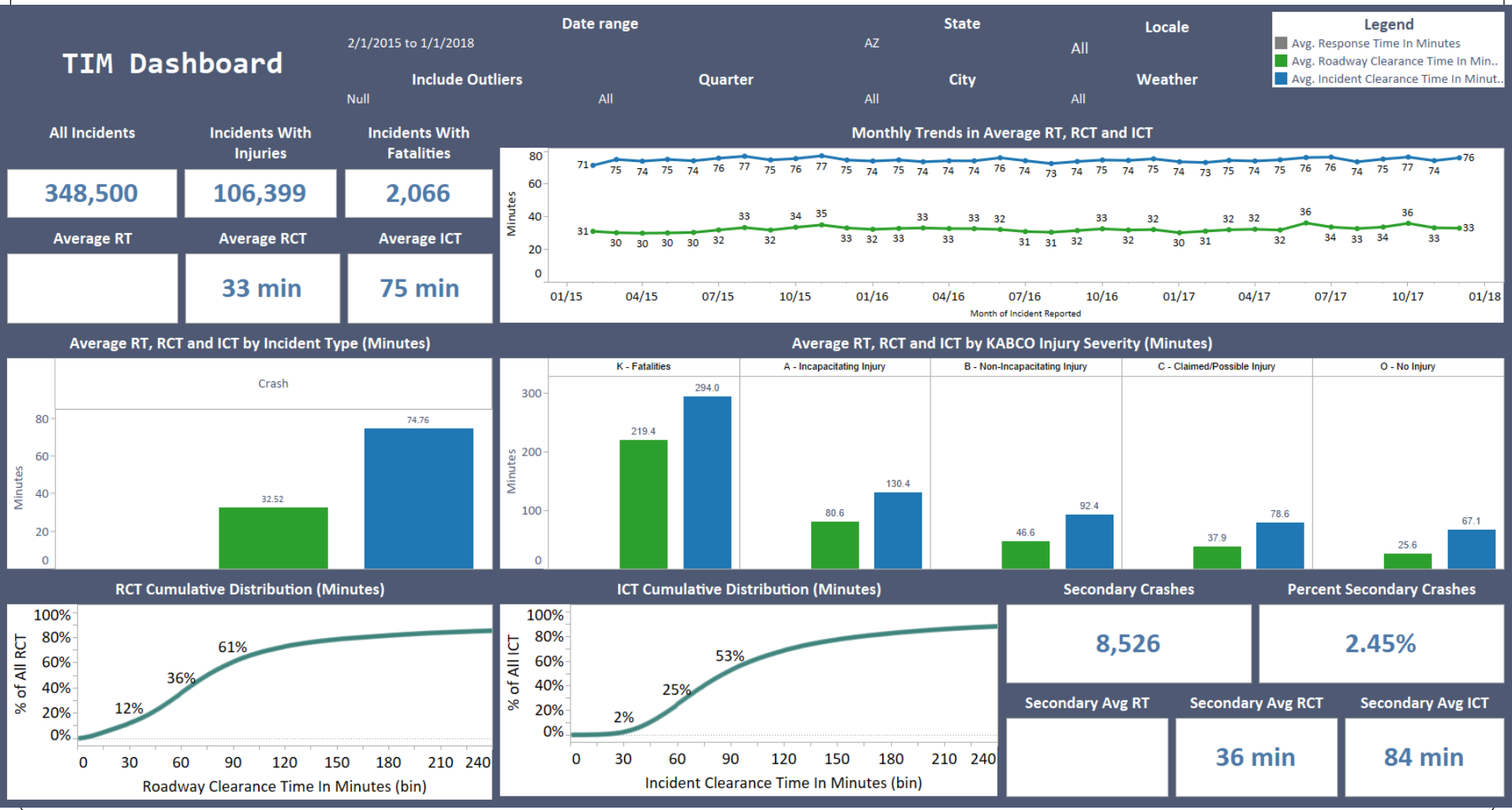
Incident Source Agency	Measures Available Full	None	Partial
Colorado River Reservation		100.00%	
Northern Arizona University		100.00%	
Navajo Reservation		100.00%	
Quartzite		100.00%	
Patagonia		100.00%	
Huachuca City		100.00%	
Hopi Reservation		100.00%	
Colorado City		100.00%	
Apache Junction		100.00%	
ndot		100.00%	
Florence	0.98%	99.02%	
Scottsdale	4.04%	95.49%	0.47%
Page	12.94%	87.06%	
Kearny	16.67%	83.33%	
MDOT	1.66%	81.36%	16.98%
Apache County	27.27%	72.73%	
San Carlos Reservation	40.00%	60.00%	
Nogales	40.00%	59.20%	0.80%
Flagstaff	39.24%	57.93%	2.82%
University of Arizona	36.54%	57.69%	5.77%
South Tucson	47.22%	52.78%	
Winslow	50.00%	50.00%	
Salt River Reservation	50.00%	50.00%	
Null	9.74%	49.04%	41.22%
Miami	52.38%	47.62%	
Santa Cruz County	51.52%	45.45%	3.03%
White Mountain Apache Rese..	58.33%	41.67%	
Phoenix	55.33%	41.49%	3.17%
Benson	47.92%	39.58%	12.50%
Ft. Apache Reservation	58.33%	33.33%	8.33%
Peoria	63.54%	32.84%	3.62%
Globe	67.24%	32.76%	
Buckeye	61.39%	32.43%	6.19%

Incident Source Agency	Measures Available Full	None	Partial
St. Johns	69.23%	30.77%	
Safford	69.29%	29.92%	0.79%
Tohono O'odham Reservation	71.43%	28.57%	
Springerville	64.29%	28.57%	7.14%
Willcox	66.67%	27.78%	5.56%
Paradise Valley	73.68%	25.73%	0.58%
Thatcher	75.41%	22.95%	1.64%
Chandler	77.02%	19.93%	3.06%
Graham County	80.00%	16.67%	3.33%
Gila County	79.55%	15.91%	4.55%
Lake Havasu City	81.75%	15.80%	2.45%
Maricopa Police Department	83.83%	15.51%	0.66%
La Paz County	85.00%	15.00%	
Gilbert	84.15%	14.70%	1.16%
Cochise County	83.76%	14.53%	1.71%
Coconino County	79.14%	14.44%	6.42%
Jerome	85.71%	14.29%	
Yuma County	83.54%	13.79%	2.67%
Tolleson	86.73%	12.09%	1.18%
Eagar	88.00%	12.00%	
Williams	88.68%	11.32%	
Surprise	88.07%	11.30%	0.63%
Arizona State University	77.78%	11.11%	11.11%
Yavapai County	87.37%	10.82%	1.80%
Sahuarita	86.08%	10.76%	3.16%
Coolidge	80.92%	10.53%	8.55%
Clarkdale	90.00%	10.00%	
Pinal County	87.59%	9.63%	2.78%
Clifton	90.63%	9.38%	
Cottonwood	88.30%	8.68%	3.02%
Casa Grande	89.40%	7.55%	3.05%
Goodyear	93.52%	5.38%	1.10%
Navajo County	92.21%	5.19%	2.60%
Glendale	92.12%	4.88%	3.00%

Incident Source Agency	Measures Available Full	None	Partial
Douglas	93.41%	4.40%	2.20%
Sierra Vista	94.22%	4.05%	1.73%
Gila River Reservation	92.70%	3.93%	3.37%
Camp Verde	96.08%	3.92%	
Mohave County	95.13%	3.44%	1.43%
Pima County	93.96%	3.42%	2.62%
Pinetop-Lakeside	95.70%	3.23%	1.08%
Parker	96.97%	3.03%	
Snowflake	94.37%	2.82%	2.82%
El Mirage	96.49%	2.81%	0.70%
Show Low	97.29%	2.71%	
Eloy	96.25%	2.50%	1.25%
Holbrook	97.62%	2.38%	
Somerton	98.25%	1.75%	
Kingman	97.57%	1.68%	0.75%
Marana	97.44%	1.37%	1.20%
Wickenburg	98.04%	1.31%	0.65%
Tempe	97.90%	1.26%	0.84%
Payson	98.94%	1.06%	
Avondale	98.10%	1.00%	0.90%
Oro Valley	98.78%	0.81%	0.41%
San Luis	98.71%	0.43%	0.86%
Prescott Valley	99.38%	0.21%	0.41%
Prescott	99.87%	0.13%	
Mesa	99.95%	0.05%	
Dept of Public Safety	100.00%	0.00%	
Bullhead City	99.00%		1.00%
Yuma	99.93%		0.07%
Tombstone	100.00%		
Greenlee County	100.00%		
Maricopa County	100.00%		
Sedona	100.00%		
Tucson	100.00%		
Chino Valley	100.00%		
Pima Community College	100.00%		
San Xavier Reservation	100.00%		

TIM PM Dashboard – Feb 2015-2017

Removing erroneous outliers does show impact on TIM PM dashboard (increases both average RCT & ICT; TIM PMs for fatalities and distributions now look as expected)



Quality Dashboard – Lane-Blocking Crashes

Crashes with RCT and ICT > zero. Crashes reduced to 187,076 (54% of total crashes). 100% of crashes have RCT & ICT. Distributions looks good.

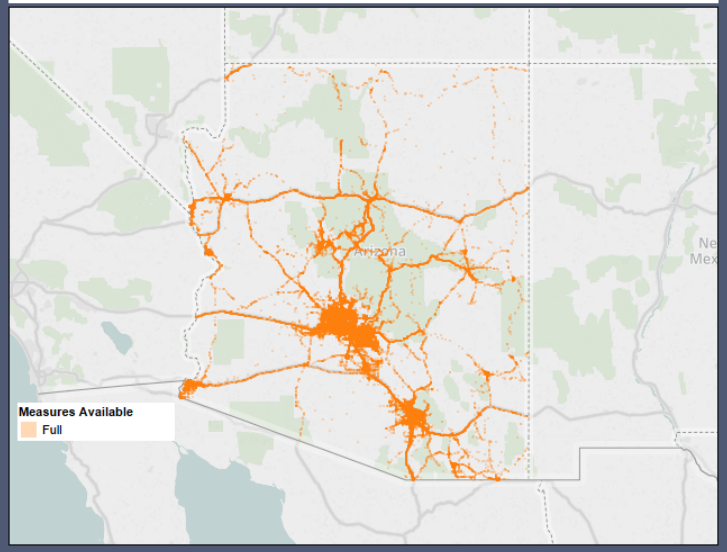
QC Dashboard

Incident Reported Date: 2/1/2015 to 1/1/2018
State: AZ
Locale: All
Include Outliers: Null
Quarter: All
City: All
Daily Icon: All

Total Records	Records With RT	Records With RCT	Records With ICT
187,076	0	187,076	187,076

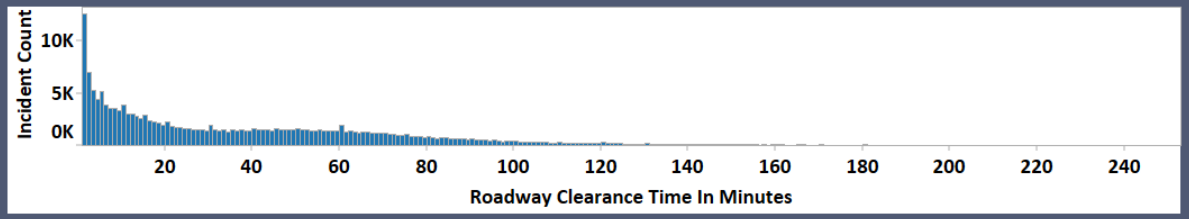
Records With All 3 Values	Percent With RT	Percent With RCT	Percent With ICT
0	0%	100%	100%

Incident Map

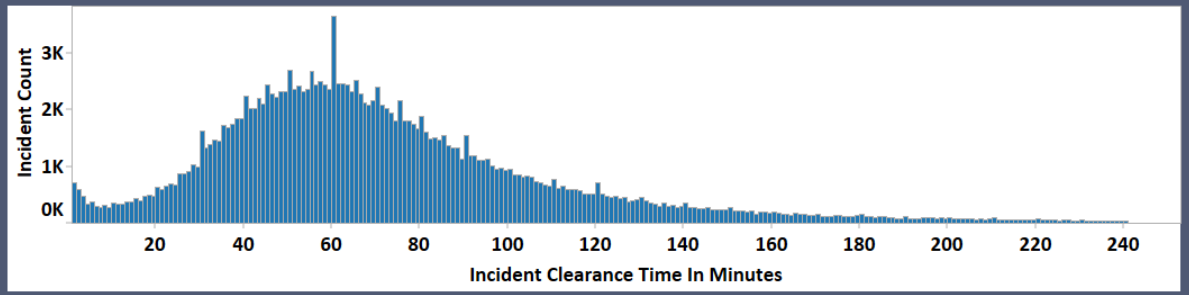


RT Histogram

RCT Histogram



ICT Histogram



Dashboard next steps

- AZ has the opportunity to receive the dashboard from the research team for our own use.
- Could be linked to the XML feeds used to send crash data which would make it more dynamic, as an example DPS sends data once a day to ADOT.
- The dashboard allows parsing the data by date range, various measures and/or specific agency(s)
- Could be modified to search specific secondary crash factors as well. During the initial demonstration, it was found that secondary crashes involving alcohol occurred almost 6 times more often on local roads as on the state highway system?

ADOT SPR-740, November 2018

- This research "Traffic Incident Management and reducing Secondary Crashes in Arizona," began the process of developing a risk model that would aid in the prediction of areas and times where the risk for secondary crashes are greatest.
- With future collection of additional data it is hoped that this research and others will help develop a tool or "mobile application" to warn responders and motorist of areas and times at greater risk of secondary crashes.
- https://apps.azdot.gov/ADOTLibrary/publications/project_reports/PDF/SPR740.pdf

TIM: Moving Forward

Mr. Mark Brown
Maricopa County Dept. of Transportation

TIM: Moving Forward

- Arterials make up 70% of the travel ways in Maricopa County.
- Encourage more municipal and local law enforcement, fire and transportation agencies to get TIM training.
- Look to incorporating the four hour TIM Responder course into the basic curriculum of public safety training academies.
- Use TIM strategies in the development of automated vehicle technology.

INC-ZONE – a prototype research project that may harness the capabilities of connected vehicles.

- Incident Scene Work Zone Alerts for Drivers and Workers (INC–ZONE)
  - In-vehicle messaging system, provides motorists with merging and speed guidance as they approach an incident scene
  - Provides motorists with warnings if they approach the incident scene at an unsafe speed or trajectory
  - Provides a warning for on-scene workers when a vehicle approaching or in the incident zone is operated outside of safe parameters for the conditions. (Audible warnings conveyed through the respective radio systems of emergency responders and the responder vehicle's horn)



INC-ZONE – The Driver's Perspective



Note: Initial warnings purposely ignored to demonstrate full-functionality of the application

In-Vehicle Displays









TIM: Moving Forward

- SHRP2 Education Connection Initiative expansion.
- Look for opportunities to enhance the connection between TOC/TMC's and field operation services.
- Our Plan, Vision and Training need to **move into action!**

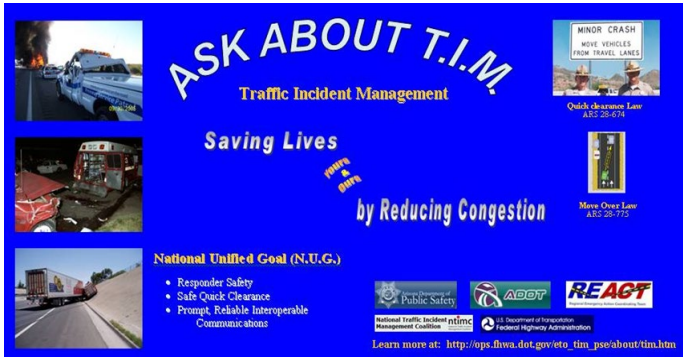
What Happens Now?

Ms. Angela Barnett
AZ. Professional Towing and Recovery Assn.

Review

- Forefront
- TIM Training
- Data
- Technology















Where Do We Go From Here?

- 24/7 Safety Service Patrols
- Towing Incentivized Programs
- Smart Work Zones
- Technology
- Shared Communication





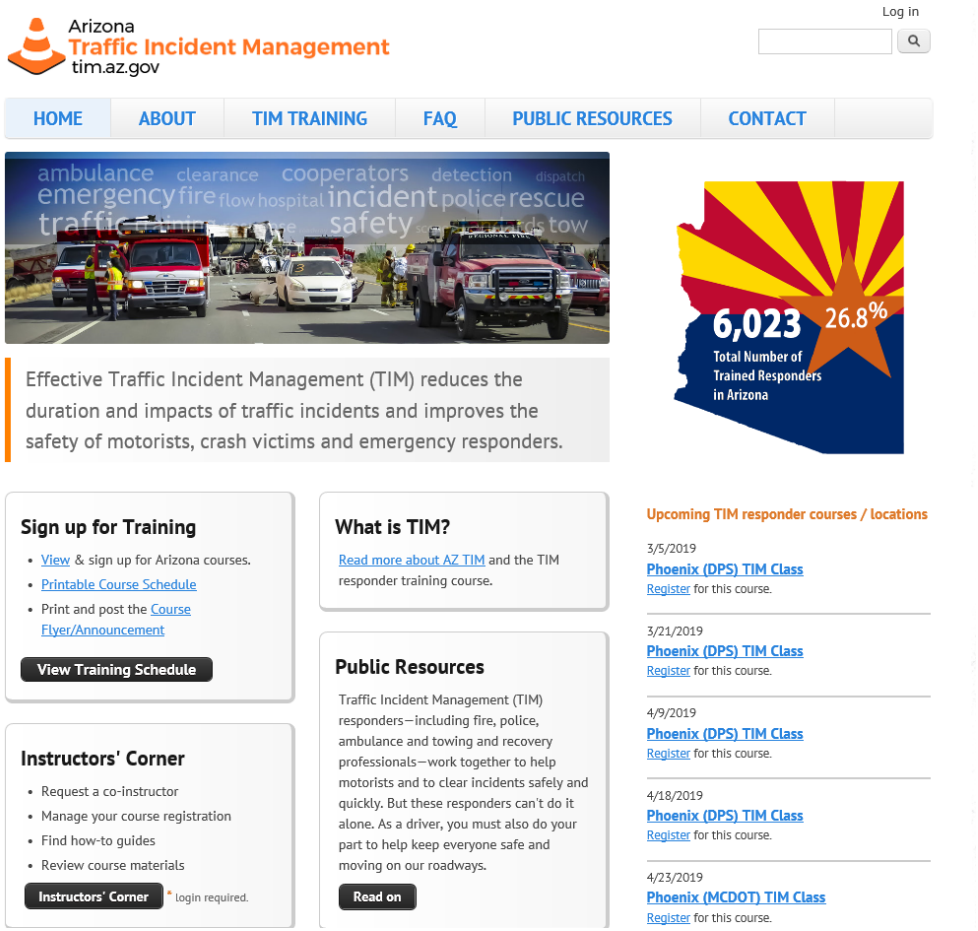








What Can You Do?



- Get Involved
- Get training
- Have conversations
- Research

https://tim.az.gov/

Four Principles

- Cooperation
- Collaboration
- Coordination
- Communication

Questions?