A Unified Approach to Crash Reporting Efforts to Obtain Better Crash Data

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Commercial Vehicle Safety Research Summit: Best Practices for Advancing Safety through Partnerships with Universities Northampton, MA



Wisconsin Traffic Operations and Safety Laboratory



Project Objectives and Motivation

- A new approach to managing and collecting crash data
 - Why important?
 - Relies on a new underlying architecture and new reporting interface for officers
- Stakeholders involvement in data collection process
 - Feedback from generators and end users considered in development
- Better data for safety improvements
 - Proactive and comprehensive data-driven approach
- Faster feedback loop
 - Proactive and data-driven approach through technology

Advancing Safety through Partnerships with Universities





Previous Practice

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Paper crash report backlogs in Texas. (GAO-10-454)



- Commonly heard from reportingofficers: "crash forms are just forinsurance companies"
 - CDIPG

MV4000 Instruction Manual

- Primary officer training resource in WI
 Last update: 1998
- Brief/vague engineering fields content:
 - No baseline definition of when to flag hills or curves
 - Poor definition of traffic barrier
 - No discussion of roundabouts
 - CM information vague





Engineering Elements Data Quality Audit

- Low accuracy for access control at partially controlled facilities
 - Highlights limited understanding of what qualifies as partial control
- Challenges for mixed conditions
 - When hills or curves are present on at least one approach, when should they be marked?
- Classification of traffic-way information
 - Misunderstanding what constitute divided roadways and barriers
- Roundabout-specific inaccuracies
 - Especially noteworthy in the horizontal curve and traffic-way fields







Change is Not Easy...



Significant advantage of Partnerships with Universities...







National Perspective: Model Minimum Uniform Crash Criteria (MMUCC) and FAST Act

MMUCC 4

- 110 Crash Data Elements
 - 77 Collected From Scene
 - 10 Derived
 - 23 Linked

4 Categories

- Crash Data Elements
- Vehicle Data Elements
- Person Data Elements
- Roadway Elements

FAST Act

TOP

- Safety Performance Measures
 - HSIP Motor and non-Motor Fatal, Injury

MMUCC Guideline

Model Minimum Uniform Crash Criteria

Fourth Edition (2012)



Wisconsin Crash Reporting Improvement Efforts

Beyond MMUCC

- Secondary Crashes
- Incident Management
- Motorcycle
- Non Motorists
- Citations for All Persons
- CV/Truck/Bus/Hazmat
- Captain Grondal Drug/Alcohol
- Crash Data Improvement Program (CDIP)
 - Key to Improvement Efforts





Replacement MV4000 Form

Summary								
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Roadway Factor(s)	Weather Condition(s)	
Animal Type	Relation To Trafficway	
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Dynamic Crash Form



Accompanying Officer Interface





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Wisconsin Traffic Operation

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Wisconsin Motor Vehicle Crash Report

TEST POLICE DEPARTMENT PO BOX 7919 MADISON, WI 53707 (608) 267-1847

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Wisconsin Motor Vehicle Crash Form DT4000 This report does not include any CJIS data. 3 Of 9



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	AL	Ejected			Ejection Path		Trapped/Extricated	
Ę	D	Not Ejected Medical Transport			EMS Agency Ident	t Applicable	Not Trapped EMS Run #	
5	S	EM8 Ground			8001122		888	
	Z	U OF MINN MED	CTR - FAIRVIEW		Date of Death		Time of Death	
		Non Motorist	Striking Unit #	Prior Action		Location		To/From School
		Action				•		•
5	90							
	_							
F	DUAI	Action Other						
'n	DN	Drug & Alcohol	Suspected A	loohol Uee	Suspected I	Drug Use		
	=	Alcohol Test Given			Alcohol Test Type		Alcohol Test Result	Is
		Drug Test Given Test Not Given			Drug Test Type		Drug Test Results	
		Drug Type			ļ		Į	
		Individual Condition						



Wisconsin Motor Vehicle Crash Form DT4000 This report does not include any CJIS data. 4 Of 9 Crash Date 11/08/2016 Crash Time 04:64 AM vironmental Engineering v of Wisconsin-Madison



0DL008M7X4 CHRIS SCENARIO 1

Wisconsin Motor Vehicle Crash Report

TEST POLICE DEPARTMENT PO BOX 7919 MADISON, WI 53707 (608) 267-1847

		Individual						
	_	Passenger TINA B ZZZCHO			Citations issued 0		Phone Number	
F	DUA				Date of Birth 02/08/1960		Sex Female	Race ASIAN
'n	INDIN	Address 100 MAIN 8T PO BOX 123 MADISON, WI 637	06 1234, U8		Driver License Nun	rber		
		Equipment	On Duty Crash		Safety Equipment			
-	5	Seat Position 3Front Seat-Righ	nt Side (Train Engi	neers/Right	Shoulder & Lap	Belt		
ò	8	Heimet Use			Helmet Compliance	•		
		Eye Protection			Tint Compliance			
		Injury	Injury Severity Suspected Serior	is injury	Airbeg Deployed-Front			
	JAL	Ejected Not Elected			Ejection Path Not Elected/Not	Applicable	Trapped/Extricated	
UNIT	MDI	Medical Transport EMS Ground			EMS Agency identi e804917	for	EMS Run # 333	
	N	Hospital AMERY REGIONA	L MEDICAL CENT	ER	Date of Death		Time of Death	
		Non Motorist	Striking Unit #	Prior Action		Location		To/From School
		Action						
5	002							
	_							
Ħ	DUA	Action Other						
5	ΜQ	Drug & Alcohol	Suspected Al	oohol Use	Suspected C	Drug Use		
	=	Alochol Test Given Test Not Given			Alcohol Test Type		Alcohol Test Results	
		Drug Test Given Test Not Given			Drug Test Type		Drug Test Results	
		Drug Type						
		Individual Condition						
		Appeared Normal						



Wisconsin Motor Vehicle Crash Form DT4000



0DL008M7X4

TOPS

Wisconsin Traffic Operat

CHRIS SCENARIO 1

Wisconsin Motor Vehicle Crash Report

TEST POLICE DEPARTMENT PO BOX 7919 MADISON, WI 53707 (608) 267-1847

	Uni	t Summary							
~	Unit	Status		Vehicle Operat	ing As Classification		Unit Type		
18	in T	ransit		A CLASS			Truck		
	Vehi	icle Type ok Tracior (Secol Affach	ad)				Operating A	a Endorsemer	IS MATERIAL
	Tota	il Occa	Train/Bus #Injured	Total # Citation	is issued	Total Traik	10-10010	Total HarMa	Types
	1			3		1		1	
	insu YE8	rance? 8	Direction Of Travel Westbound	Pre Cr.	ashTire ark	Speed Lim 45	it.	Total Lanes 2	
E	Mos	Harmful Event: Collision W	th	Special Function	xn		Emergency	Motor Vehicle	Use
S	Mot	tor Veh in Transport		NO Special P	unotion		Not Appli	Dable	
	Two	a-Way, Not Divided		No Control			NO NO	rol inoperative	Wissing
	Surl Bla	ace Type oktop (Bituminous)		Road Curvatur Curve Right	0		Road Grade Uphill	,	
	Truc Any	* Bus or HazMat / truck or truck combine	ation > 10.000lbs GVWR/G0	WR	Reporting Thresh Medical Trans	old port			
—		Vehicle			1				
		License Plate Number		Plate Type		81	Country of Is	suance	
62		T839747		TOR - Track	or	w	UNITED 81	TATE8	
	ш	Vehicle Identification Numb 4V5NC8EH4FN831602	Her .	Make VOLVO		Year 2015	Model VINX 630		
	CL	Color		Body Style			Bus Use		
E	Ξ	CAM - Camouflage		CB - CAB C	HASSIS		NOT A BUG		
5	>	12-Front		Venicle Dama	90				
		Extent Of Damage		12Front					
		Minor Damage							
N		Towed Due To Damage Not Towed		OPERATOR	ved By t				
0		What Driver Was Doing		Vehicle Factor	5				
		Driver Prior Action Other		Brakes					
	ш								
Ę	CL	Speed Too Fact/Cond,	Improper Turn, Failed To I	Keep in Decig	nated Lane, Ope	rated Moto	or Vehicle I	n inattentive	e, Careless or
5	é	Erratio Manner							
	-								
		Driver Distractions Distraction/Inattention	1						
	1	Vehicle Owner							
2	36	Individual JOHNNY Z ZZZANDER	8	Address 600 Will	LIAMS ST				
0	N			MADISC	N, WI 63706 , U	8			
	50								
		Sequence Of Even	ts						
	9	Cross Centerline							
Wisco Form	DT40	Motor Vehicle Crash 60	This re	port does not inc 6 Of	lude any CJIS data. 9			Crash Date Crash Time	11/08/2016 04:64 AM

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TEST POLICE DEPARTMENT Wisconsin Motor Vehicle 0DL008M7X4 PO BOX 7919 Crash Report CHRIS SCENARIO 1 MADISON, WI 53707 (608) 267-1847 Individual Driver Citations issued Phone Number JOHNNY Z ZZZANDERS 3 INDIMIDUAL Date of Birth Sec Race BLACK UNIT 02/12/1962 Male Driver License Number Z3324396206208 Address 600 WILLIAMS ST MADISON, WI 63706 , US State: Wisconsin Country: UNITED STATES On Duty Crash Safety Equipment Equipment Shoulder & Lap Belt Seat Position 1-Front Seat-Left Side (Driver/Motoroyole/Bioyol 003 82 Heimet Use Helmet Compliance Eve Protection Tint Compliance Injury Severity Airbeg Injury No Apparent Injury Non Deployed Ejected Ejection Path Trapped/Extricated NDMDUAL Not Ejected Not Ejeoted/Not Applicable Not Trapped UNIT Medical Transport EMS Run # EMS Agency Identifier Not Transported Hospital Date of Death Time of Death Striking Unit # Prior Action Location Ta/From School Non Motorist Action 003 02 NDMIDUAL Action Other UNIT Drug & 🖌 Suspected Alcohol Use Suspected Drug Use Alcohol Alcohol Test Type Alcohol Test Results Alcohol Test Given Test Given Evidentiary Breath Test (EBT) Pending Drug Test Given Drug Test Results Drug Test Type Blood Test Given Pending Drug Type Individual Condition Asleep or Fatigued, Under The Influence Of Medications/Drugs/ Alophol, Confused or Disoriented (Non Lucid) Violations UTC Number Statute Number Description OPERATING WHILE UNDER THE INFLUENCE Issue To? Seq Num 002 348.83(1)(a) 5 A100024 003 UTC Number Issue To' Statute Number Seq Nun 004 Description 348.67(4)(k) SPEEDING ON RUSTIC ROAD/45 MPH (20-24 MPH) 20 003 A100026 UTC Number Issue To? Statute Number 347,36(3)(a) Seq Num 001 Description OPERATE SEMITRAILER W/O CAPABLE BRAKES 3 A100028 003





Wisconsin Motor Vehicle Crash Form DT4000 This report does not include any CJIS data. 8 Of 9



ODL008M7X4 Chris Scenario 1

Wisconsin Motor Vehicle Crash Report

TEST POLICE DEPARTMENT PO BOX 7919 MADISON, WI 53707 (608) 267-1847

									(000) 201 104
		Carrier							
		Use Vehicle Same as C	Owner Carrier	Carrier Name JOHNNY Z ZZ	ZANDER8			Source Trip-Manifest	
12	SUS	Name				Address		•	
-	Š	GVWR 103	Vehicle C Truck Tr	onfiguration ractor/Semi-Trai	ller		Cargo Body 1 Cargo Tani	iype K	
F	TRU	US DOT # 12345		Carrier Type Interstate Carr	fier			Permitted Load Not Applicable	
N		OS/OW Load	W Permit	Number	Permitted Ve	shiole On Route	Eccor	t Vehicle Required By Permit	Essort Vehicle Present
		Measured Height 12 FT 11 IN		Measured Len 38 FT 2 IN	igth	Measured Wid 8 FT 0 IN	âh	Measured Weig 40000 LBS	ht
		Hazardous Ma	terial						
	2	HazMat Class Corrosives-8.0				HazMat UN I 1789	•	HazMat Released NO	
	MAT	HazMat Name HYDROCHLORIC	ACID					HazMat Placard Display YES	yed







Resolve System: Post Crash Data Management

- Web Based
 - Enhanced Editing & Validation
- Multiple Roles
 - CRU, FARS, DMV, FMCSA
 - Risk Management
- Version History
 - Key to management policies and quality controls

	Wisconsin	Crash Datab	ase & Re	solve S	ystem	
Home	Main Menu	Reports	Contact		Help	Admin
ome / Applications /	/ Resolve / Main Menu		👤 Welco	me User 🛛 👤	Manage Account	→] Sign Out
rash Report PDF	e All Back to Search	View Cras	h Record		Record N Record S Follow-up Follow-up History	lumber: 2 v Status: Test p Date: N/A Record Histo
Expand Collapse		Crash - 1401002	43 - 01/01/2014			Edit
Crash Summary Location Factors Other Details						
Crash Summary Location Factors <u>Other Details</u>		Crack Inium Severit		Access (ontroli	
Crash Summary Location Factors <u>Other Details</u> Crash Severity 2 - Injury	y:	Crash Injury Severity A - Suspected Major In	y: ıjury	Access C	ontrol: Control	
Crash Summary Location Factors Other Details Crash Severity 2 - Injury First Harmful I	y: Event Location:	Crash Injury Severity A - Suspected Major In First Harmful Event:	y: njury	Access C 103 - No Ritn Junc	ontrol: Control :tion-Interchange A	rea:
Crash Summary Location Factors Other Details Crash Severity 2 - Injury First Harmful I 101 - On Roady	y: Event Location: way	Crash Injury Severit A - Suspected Major Ir First Harmful Event: 101 - Motor Veh In Tra	y: ijury nsport	Access C 103 - No Ritn Junc 999 - Unk	ontrol: Control tion-Interchange A nown	rea:
Crash Summary Location Factors <u>Other Details</u> Crash Severity 2 - Injury First Harmful I 101 - On Roady Ritn Junction-	y: Event Location: way Specific Location:	Crash Injury Severity A - Suspected Major Ir First Harmful Event: 101 - Motor Veh In Trai Intersection Type:	y: njury	Access C 103 - No Ritn Junc 999 - Unk School B	ontrol: Control tion-Interchange A nown us Related:	rea:
Crash Summary Location Factors Other Details Crash Severity 2 - Injury First Harmful I 101 - On Roadu Ritn Junction- 999 - Unknown	y: Event Location: way -Specific Location:	Crash Injury Severity A - Suspected Major Ir First Harmful Event: 101 - Motor Veh In Tra Intersection Type: 998 - Other	y: njury	Access C 103 - No Ritn Junc 999 - Unk School B 101 - No	ontrol: Control tion-Interchange A nown us Related:	rea:
Crash Summary Location Factors Other Details Crash Severity 2 - Injury First Harmful I 101 - On Roady Ritn Junction- 999 - Unknown Alcohol Involv	y: Event Location: way •Specific Location: rement:	Crash Injury Severity A - Suspected Major Ir First Harmful Event: 101 - Motor Veh In Trai Intersection Type: 998 - Other Drug Involvement:	y: ijury nsport	Access C 103 - No Ritn Junc 999 - Unk School B 101 - No Additiona	ontrol: Control ttion-Interchange A nown us Related: ul Forms or Data:	rea:





Resolve System: Post Crash Data Management

Enhanced Reporting

- System enables the inclusion supplemental datasets.
- Support Difference Transportation Areas
 - Policy Changes
 - EMS Preparation
 - Education
 - Engineering Countermeasures
 - Increased Law Enforcement





OP



Supporting Data for Resolve System

- Fusion of WisDOT functional areas datasets
- Years of university partnership research on traffic safety
- Databases developed by research team







Impacts to Law Enforcement

- Key focus on public safety!
- TraCS Form Transmission Process
- Automate Up Front Validation Steps
- Requirement for Electronic Reporting
- Maintain Communication & Feedback During Resolve Processing
- TIME, Wisconsin.Gov Access Unchanged
- Changes to Data Extracts, WisTransPortal







Impacts to Law Enforcement

- Weed out fields that had become obsolete
 - Identify others that were not being collected (i.e., phasing, roundabouts or cell phone use)
- Form is more intuitive
 - Great savings at both the state and local level by gathering correct and accurate data
- Easily describe what happened
 - Cell phone usage, roundabouts, cross median crashes









Beyond Quality Data

- Nature and structure of data meets future needs
 - Integration with highway geometric data.
- New safety analysis and planning procedures possible
 - Result of multiple datasets fusion.
- Approach is flexible enough to evolve faster than current system
 - Results from underlying architecture



Department of Civil and Environmental Engineering

University of Wisconsin-Madison



How the Future of Safety Data Looks

- Faster and 'Better' Data
- Rapid Identification and Response to Safety Problems
- Technology at the Heart of Countermeasures Development – Human factor
- Immediate Feedback Loop Between Agencies and Manufacturers









Commercial Vehicle Data

- Automatic XML feed to FMCSA SafetyNet
 - Improved data quality to federal database
- More Thorough Data Elements and Attributes
 - All elements required for commercial vehicles regardless of regulatory licensing
- Data into police vehicles (or elsewhere?) to improve enforcement





Summary

- Improving crash data means improving knowledge and safety
- Better decisions for all vehicles types
- Enhancing the implementation of future technologies
- Challenge data, and lots of it!





A Unified Approach to Crash Reporting Efforts to Obtain Better Crash Data

David A. Noyce, PhD, PE, F.ASCE Chair, Department of Civil and Environmental Engineering Director, Traffic Operations and Safety Laboratory University of Wisconsin-Madison

Commercial Vehicle Safety Research Summit: Best Practices for Advancing Safety through Partnerships with Universities Northampton, MA



Wisconsin Traffic Operations and Safety Laboratory

