

## *Utah Transit Authority*

# Creating a Model Transit Safety Organization

*Global Level Crossing Safety and  
Trespasser Prevention Symposium*

*August 2014*

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# Topics

- UTA System
- Safety Focus
- Organization
- “Hold Point” activation process
- Pedestrian Grade Crossing Design
- Coordination
- Hazard Identification / Tracking / Mitigation
- Take Aways

# UTA System



FrontRunner (Commuter Rail)



TRAX (Light Rail)



Bus (Diesel, CNG, BRT)

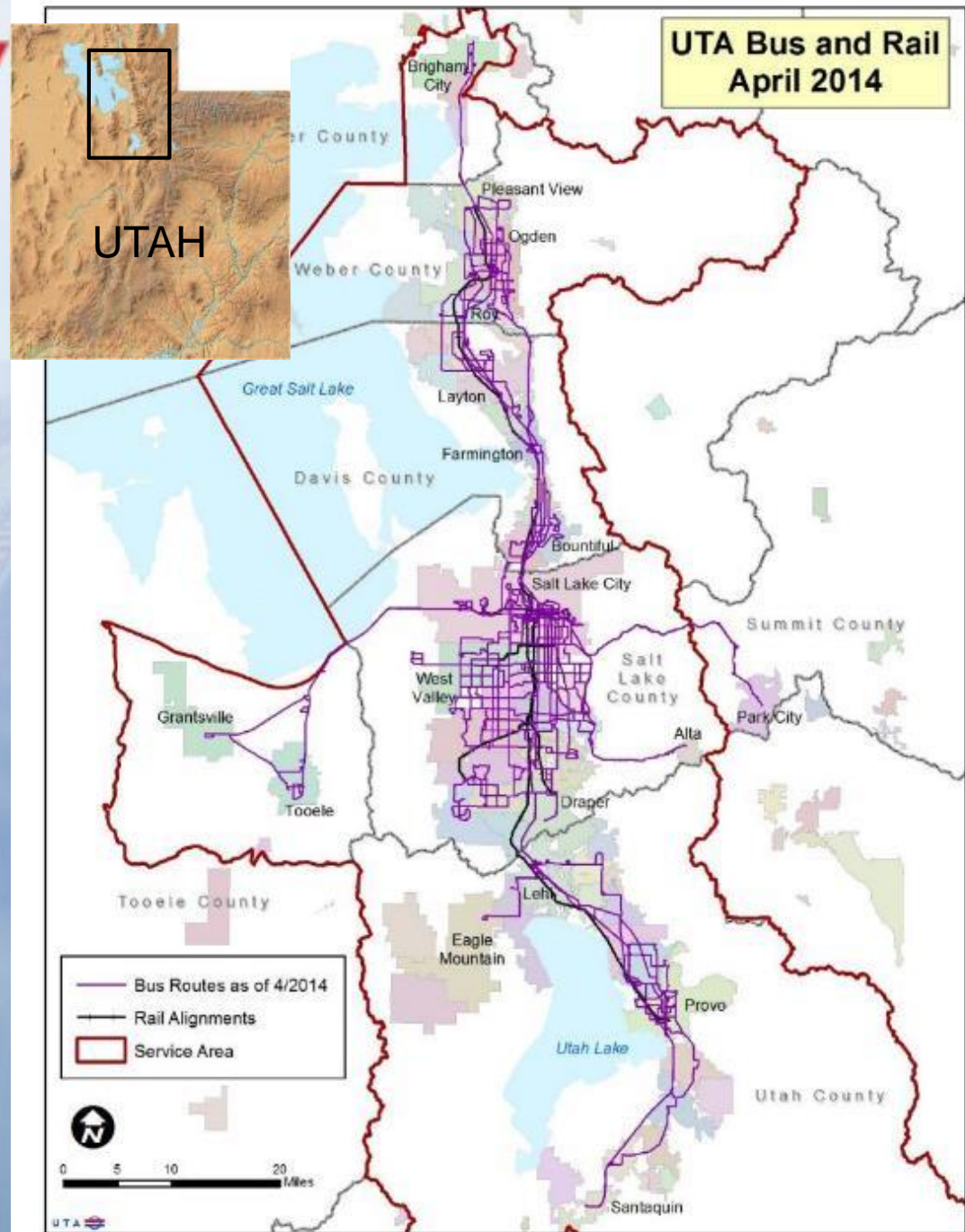


S-Line (Streetcar)

# Service Area

6 Counties  
85 Municipalities  
2.25 mil  
population  
4,158 sq mi

140 Rail Miles  
157 at grade Xings  
6,500 Bus Stops  
2,300 employees



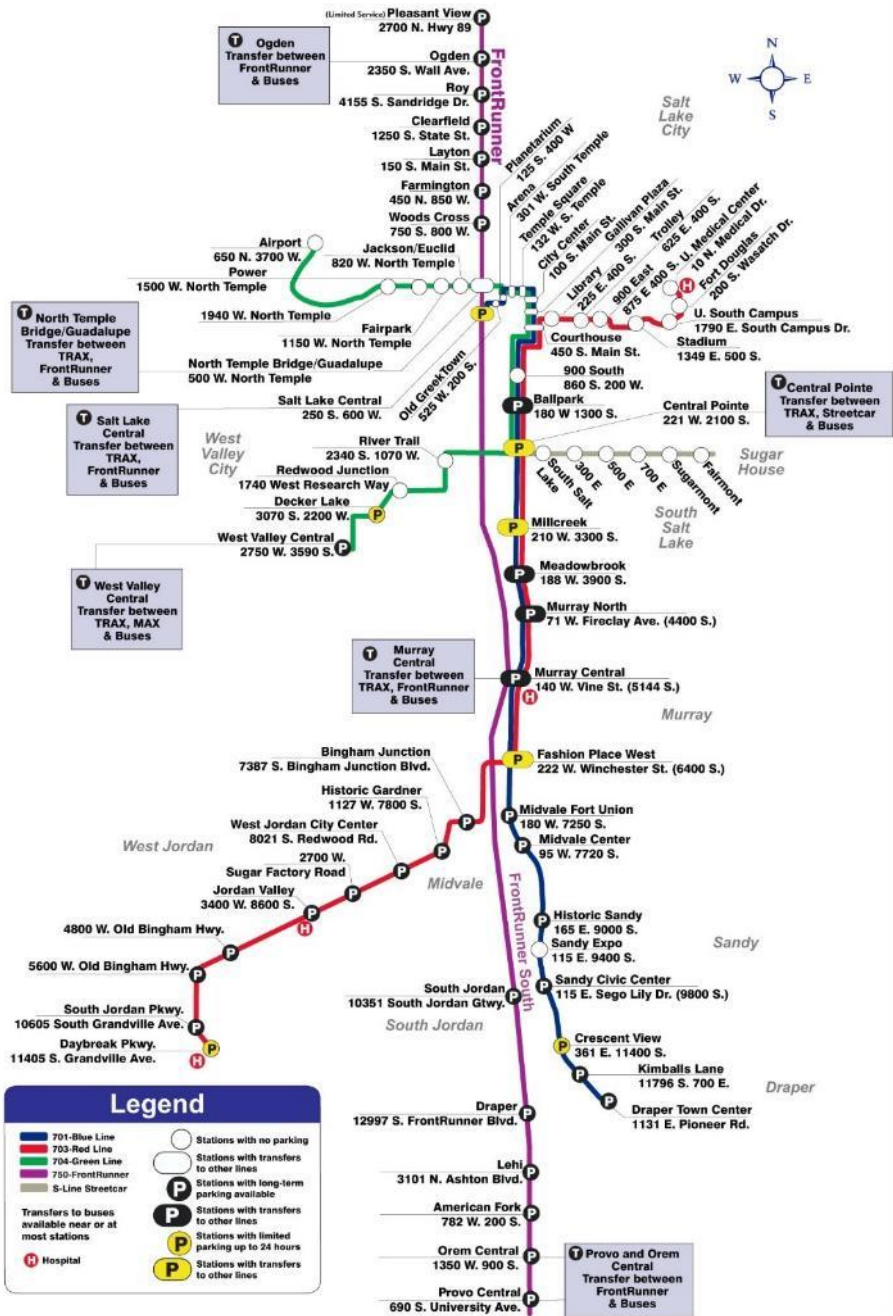
# UTA Rail Openings

## *140 Miles in 14 years*

- TRAX (Light Rail) North South 15 mi Dec 1999
- TRAX University Line 2 mi Jan 2002
- TRAX Med Extension 2 mi Aug 2003
- FrontRunner (CRT) North 45 mi Apr 2008
- TRAX Hub Extension 2 mi Aug 2008
- TRAX Mid Jordan 11 mi Aug 2011
- TRAX West Valley 6 mi Aug 2011
- FrontRunner South 45 mi Dec 2012
- TRAX Airport 6 mi Apr 2013
- TRAX Draper 4 mi Aug 2013
- S-Line Streetcar 2 mi Dec 2013



# Recent Projects



# UTA Rail System

TRAX (Light Rail) 48 mi

- Red (Daybreak-UofU)
- Blue (North – South)
- Green (WV- AP)

FrontRunner (Commuter)

Ogden – Provo 90 mi

S Line (Streetcar) 2 mi

# Airport TRAX Successes

- 2014 AGC National Award
- Alliance agreement
- Solar panels on stations
- North Temple Viaduct
- Grand Boulevard





## ***Draper Historic Rail Car Plaza***



# S-Line Partnering Successes

- \$1 Billion in area development
- Greenway and Parley's trail



# Safety Goals

- Organize
- Emphasize
- Better Coordinate
- Reduce incidents
- Activate new lines safely
- Find, Fix, Follow Up



# Safety Focus



- Safety Culture
  - Safety Ambassadors
  - Safety First Moment at all meetings
  - Safety Committees
  - Track and Mitigate Hazards
  - Weekly Safety message / Monthly Poster
- 4E's+
  - Eliminate, Educate, Engineer,  
Enforce + Encourage
- Safety Management System (SMS) certified
- Security - UTA Police Department (60 Officers)
  - Customer Service, Law and Fare Enforcement
  - TSA Gold Standard Award (2013)



# Safety Methods

- Track on Local or Corporate Hazard Logs
  - Mitigate Hazards within 180 Days
  - No High or Serious Hazards on the system
- Assign / Assume responsibilities
- Monthly BU Safety Committee Meetings
- SSWG on each project
- Report Progress (Corporate Staff, GMSSC)
- Develop pedestrian safety treatments
- Implement Activation Process
- Continual encouragement / reminders



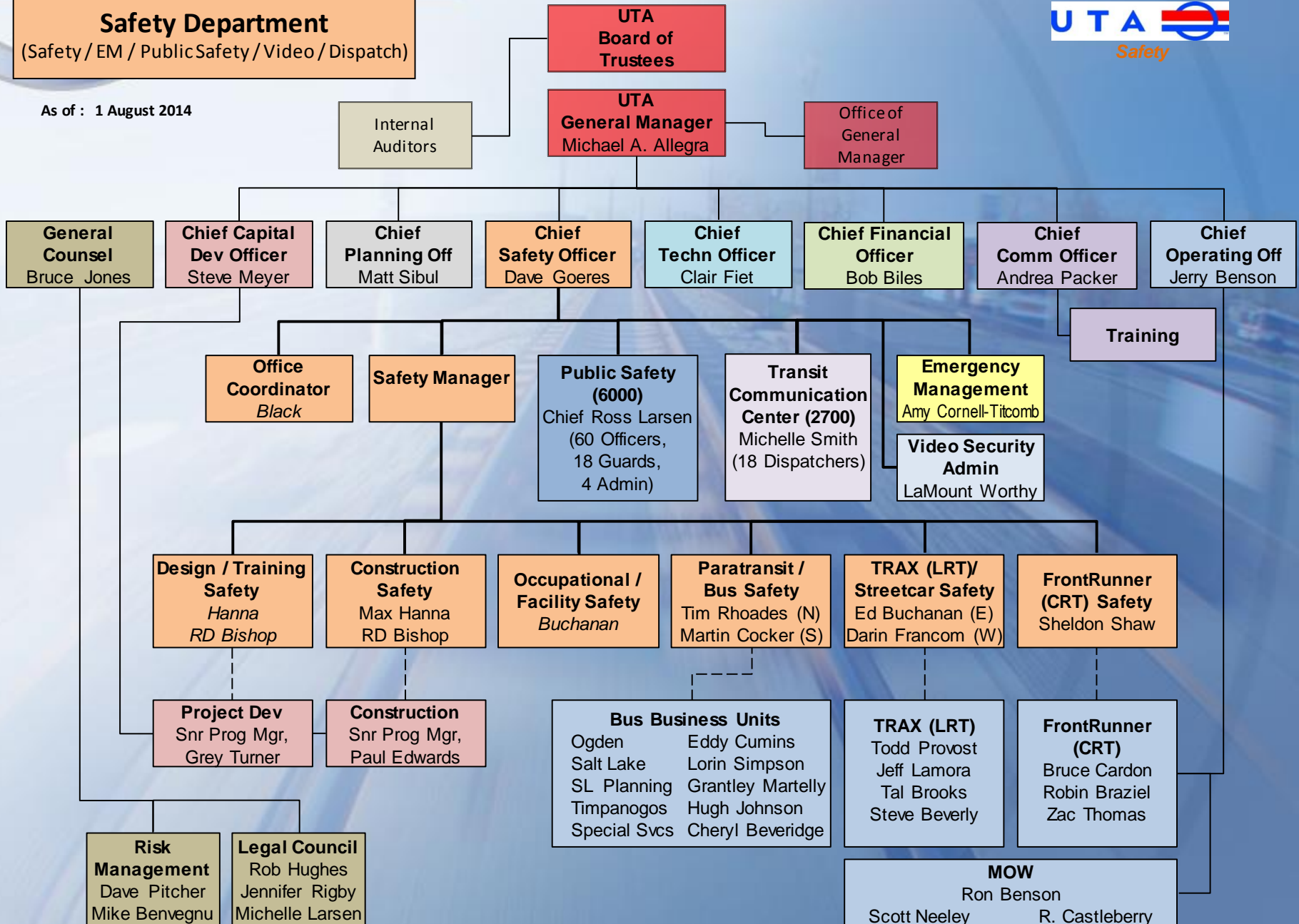
# **Safety Organization**

# Organization

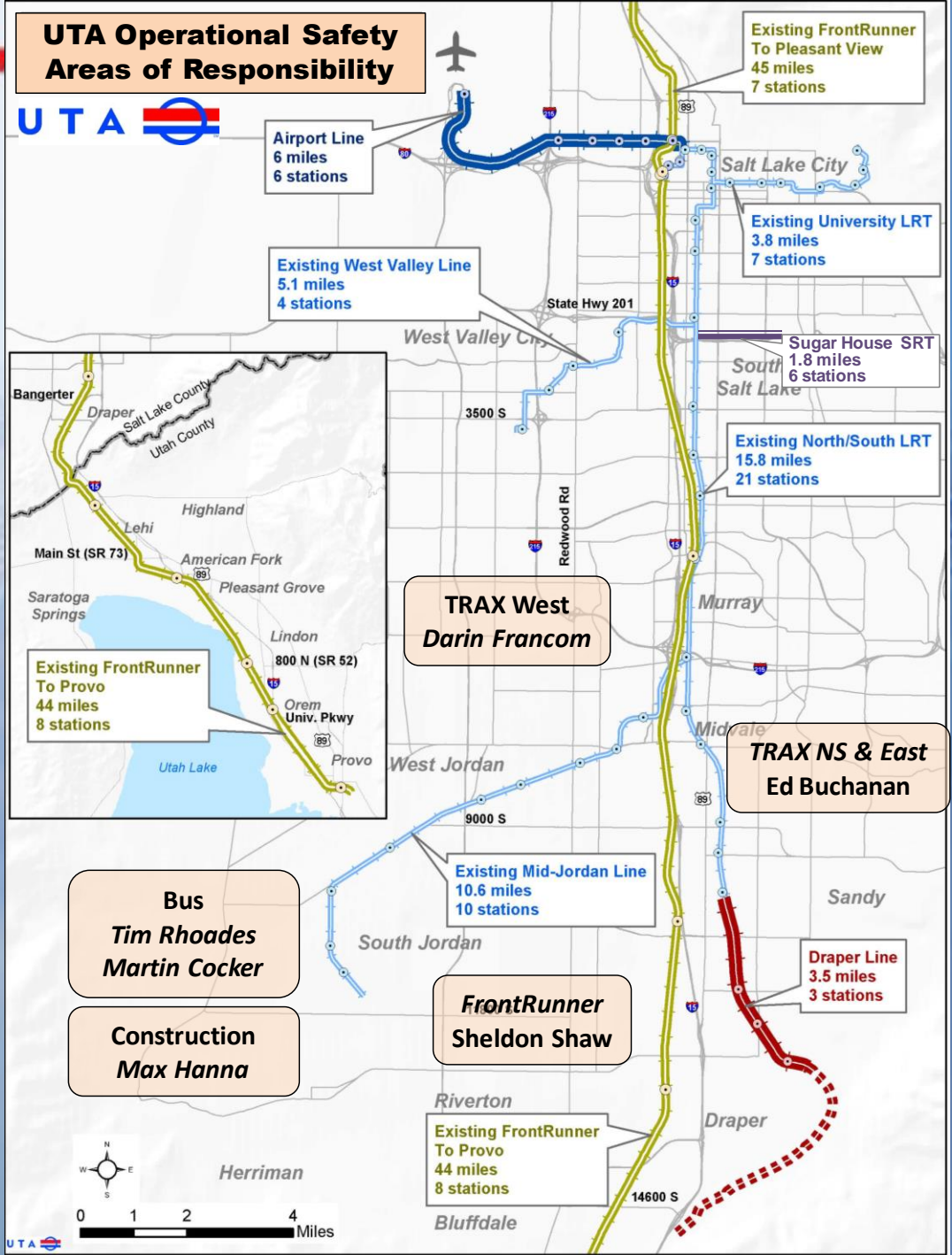


**Safety Department**  
(Safety / EM / Public Safety / Video / Dispatch)

As of : 1 August 2014



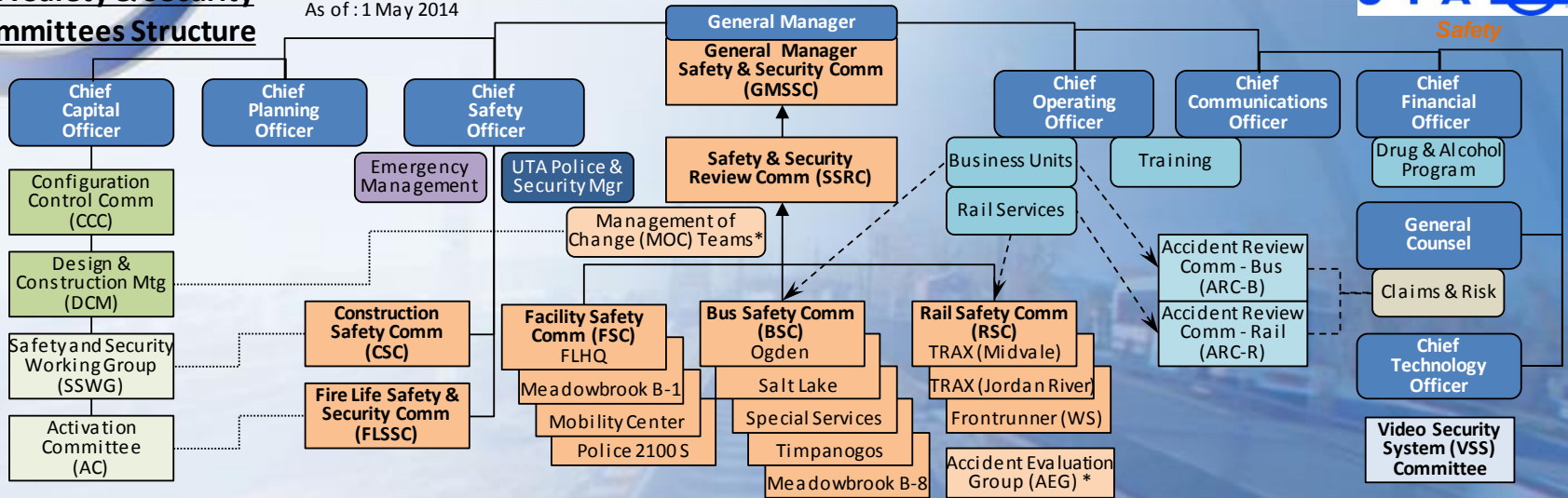
# Areas of Responsibility





## UTA Safety & Security Committees Structure

As of : 1 May 2014



\* Formed based on type of action / review required

## UTA Safety Committee Members

Committee	GMSSC	SSRC	CSC	FLSSC	BSCx5	RSCx3	FSCx4	RAC
<b>Chair &gt;</b>	General Manager	Chief Safety Officer	SA-Construction	SA-FR	BU RGM/Snr Mgr	RS DGM/Snr Mgr	Snr Mgr	Rail Actv Mgr
<b>Alt Chair &gt;</b>	Chief Safety Officer	Security Mgr	Safety Manager	SA-LR	BU Maint Mgr	Maint Mgr	Facilities Rep	Safety
<b>Members &gt;</b>	Corporate Staff (13)	BU RGM BU RGM BU Maint Mgr RS FR Mgr RS TRAX Mgr RS MOW Mgr Cap Dev Prj Dev Cap Dev Constr Technology Office	Cap Dev Constr SAs Safety Training Security Claims Contractor's Construction Mgr Safety Manager	UTA Police TRAX Opns FR Opns Bus Opns UTA Dispatch SLC Police SLFD TSA Rep	SA-Bus BU Opn Mgr Operators (2) Maint Staff (2)	SA-Rail Opn Mgr Operators (2) Maint Staff (2)	Dept Mgrs/Rep	Systems Construction Rail Svcs Chief Safety Off Snr Prog Mgr
<b>Invitees</b>		RS FR Mgr RS TRAX Mgr RS MOW Mgr Cap Dev Prj Dev Cap Dev Constr Technology Office	Contractor's Construction Mgr Safety Manager	SLC Police SLFD TSA Rep	<b>Invitees</b> Claims Legal	<b>Invitees</b> Claims Legal	<b>Invitees</b> Claims Legal	
		<b>Invitees</b> Cap Dev Env Mgr Cap Dev Facilities Claims Legal SAs Auditor	<b>Invitees</b> Legal Insurance Agents	<b>Assoc Mbrs</b> AP Police DR Police SSL Police Lehi Fire Weber Co Police	<b>Invitees</b> UTA CS / PR Safety Training UTA EMA UTA ADA UTA Facilities			<b>ARCx2</b> Admin Ops-B CBU Ops-B Admin Ops-R CBU Ops-R Tiebreaker
								<b>Invitees</b> Legal Claims

# TRAX/SRT Hazard Tracking Log

As of: 7-May-13

## TRAX Hazard Log 2013

Source	Date	Time	Seg / Line / BU / Fac	Issue / Location	Emp. #	Veh. #	Brief Description of Hazard / Incident	Prob Cause	Total Damage	Hrs Dsrpt Svc	# injury trnspt	# fatality	IHR
UDOT	8-Dec-11	N/A	JRSC	Mirros on T14,15	N/A	N/A	Install mirros on south side of tracks 14 & 15.	N/A	N/A	N/A	N/A	N/A	4D
UDOT	18-Jan-12	N/A	NS	Central Ave	N/A	N/A	Grade Crossing upgrade evaluations at Central Ave (4115 S) to improve signals and add gates.	N/A	N/A	N/A	N/A	N/A	2B
Incident	30-May-12	N/A	NS	6100 S	N/A	N/A	In the event N.B. trains are delayed at the platform of Fashion Place West the gates are held in the down position for the duration encouraging vehicle traffic to go around gates.	N/A	N/A	N/A	N/A	N/A	3D
UDOT	20-Jan-12	N/A	Hub Ex	Daybreak Platform	N/A	N/A	Daybreak Pkwy, N. & So. End of platform, Duckhorn Dr. No Ped call buttons on station, peds must cross street to reach ped call buttons on E	N/A	N/A	N/A	N/A	N/A	M

### Open Hazards

Discussion / Corrective Action														Resp. Dept/POC	Days Open	Closed Date	FHR	NTD	FRA	UDO T	CAP ID	UDOT Comments	UTA Comments
<b>CAPS</b> Temporary mirrors installed. Updated by Tal Brooks on 7/17 they are reassessing for better solution. Issue discussed in Safety Committee mtg. on 4/10. Tal and Paul O'Brien are discussed possible solutions. Will determine a solution by next safety meeting.														Facilities / Rob Haider	517						<a href="#">12-017</a>		
J-walk cut across the cross the tracks in of also TRAX passing across 400 south.														T Baxter	476						<a href="#">12-022</a>	N/A	
C. Action would involve system changes to call gates as NB train departs FPW. No action taken as of 9/19/12.														MOW / Systems Eng Benson / Baxter	343			N/A	N/A	N/A	<a href="#">12-023</a>	N/A	N/A
Install Pushbuttons at both ends of Daybreak Parkway platform to allow pedestrians to cross track and street. Discussed in SSRC on 4/11. Todd Provost assigned to Travis Baxter.														CD / Provost / Baxter	474						<a href="#">12-024</a>		
Gap has been adjusted down as much as possible. Cleaning supplies available in the system. Seimens is still evaluating. Discussed in Safety Committee mtg on 4/11/2013. First installation will begin on June 6.														Saini, Sharanjit / Rail Vehicle Procurement	426						<a href="#">12-026</a>	N/A	
"Please use crosswalk" painted on the edge of the platform. Yellow line painted on the crosswalk to keep pedestrian at a safe distace from the train. Discussed at SSRC on 4/12/13. Needs follow up with T. Hare.														CD Fac / Hare	407						<a href="#">12-032</a>	N/A	
UTA police to conduct a site evaluation to include education and enforcement. Proposed completion date 9/6/2013.														Police / Boddy	359						<a href="#">12-036</a>	N/A	
Install a gate at the intersection of Mario Capecchi Drive and South Wasatch Drive. On the Capital Project List (RAP0582). New drawings sent out 12/10/12. Contractor waiting for comments. Proposed completion date April 2014.														Cap D / Baxter	359						<a href="#">12-039</a>	3-15-11 UTA is examining options to install Z crossing at grade crossing.	

Open Items 37

# Safety Dashboard

## SAFETY & Emergency Mgmt Dashboard

Reactive -> Proactive -> Predictive  
Find -> Fix -> Follow Up

### Leading / Influencing Indicators

Safety Measures	Admin	Bus	TRAX	FR	Monthly			YTD	2012	2013	Pace
					Total	Goal	%				
Safety Committee Mtgs	1	4	2	3	10	9	111%	118	82	118	
Education Outreach	-	-	19	5	24	8	300%	153	71	153	
# interviews	na	45	163	68	276	80	345%	1777	36	1777	
# rides / observations	na	15	71	28	114	24	475%	777	201	777	
Avg days on Hazard Log	na	343	229	452	341	180	190%	na	244	na	
# "High" open hazards	na	2	8	-	10	0		10	8	na	
Hazards Closed (YTD)	na	11	79	41	131	na	na	131	77	131	
Broken Gates	na	na	9	3	12	10		254	225	254	
Emergency Braking	na	na	26	3	29	8		155	95	155	

### Emergency Mgmt

Emergency Mgmt	Admin	Bus	TRAX	FR	Yearly		
					YTD	Goal	%
Emergency Mgmt Mtgs	-	-	2	-	30	32	94%
Facility Fire Drills	-	-	1	-	25	26	96%
Exercises	-	-	-	-	10	6	167%
EM Log Items	-	-	2	-	165	na	na
EM Log Items Closed	8	2	1	1	89	na	na

### Audit Findings

	Total	Submttd	%	Closed	% Approved
FTA Audit Jun11	17	17	100%	17	100%
UDOT SSO Triennial Jan12	25	25	100%	25	100%
APTA FrontRunner Apr12	5	5	100%	5	100%
FTA SH SSRR Nov 21	0	0	0	na	na
UDOT SH PRSR Oct 29	0	0	0	na	na
FTA Follow Up Aug12	0	0	0	na	na
FTA DR SSRR Jan13	0	0	0	na	na
UDOT AP PRSR Feb13	0	0	0	na	na
UDOT Hrs of Svcs Feb13	0	0	0	na	na
NSF Safety Mgt Sys May13	0	0	0	na	na
FTA SH SSRR May 13	0	0	0	na	na
UDOT DR PRSR Jun 13	0	0	0	na	na
<b>Total</b>	<b>47</b>	<b>47</b>	<b>100%</b>	<b>47</b>	<b>100%</b>

### Other

Safety Admin TSI Courses	32	of	32	100%
Safety Admins TQSP Certified	8	of	8	100%

Improving / Good +  
Stable / Acceptable o  
Declining / Poor -

December-2013 Final

### Lagging Indicators

(Graphs on second page)

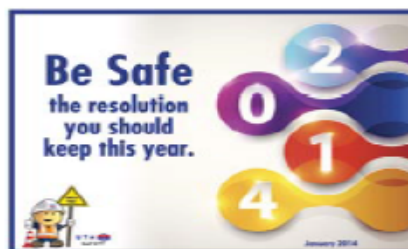
TRAX	Mo	YTD	Monthly / YTD Fatalities	2012	2013	Pace
NTD Major Accidents	3	18	Trv. Ped, Trv. MV, Trv Tress.	24	18	
NTD Major Injuries	3	14	Trv. Ped, Trv. MV, Trv Tress.	13	14	
Summary Injuries	1	9	Pass Fall	4	9	
Fatalities	0	2	NA / Suicide, Bike	5		
FRA Major Accidents	0	5	NA	2	5	
Injuries	0	4	NA	2	4	
Fatalities	0	3	NA / Bike (secondary), Suicide, MV			

Bus	All Accidents			Avoidable			NTD Major			2012	2013	Pace
	Mo	YTD	%YTD	Mo	YTD	%YTD	Mo	YTD				
Meadowbrook	36	270	73	27%	7	73	27%	2	12	231	270	
Central	16	110	4	39	35%	2	6	100	110			
Special Svcs	6	69	3	29	42%	0	5	61	69			
Ogden	9	94	1	25	27%	1	5	86	94			
Timpanogos	9	64	2	27	42%	1	2	85	64			
<b>All Accidents</b>	<b>76</b>	<b>607</b>	<b>17</b>	<b>193</b>	<b>32%</b>	<b>6</b>	<b>30</b>	<b>563</b>	<b>607</b>			

Monthly / YTD Fatalities											
NTD Major Accidents	6	30	2 Mv R-end bus, 3 MV ran signal						26	30	
NTD Major - Injuries	6	34	MV v Bus (3 MV), (1 Bus Pass), (						33	34	
Summary Injuries	1	10	Pass Fall						10	10	
Fatalities	0	0	NA								

### Construction

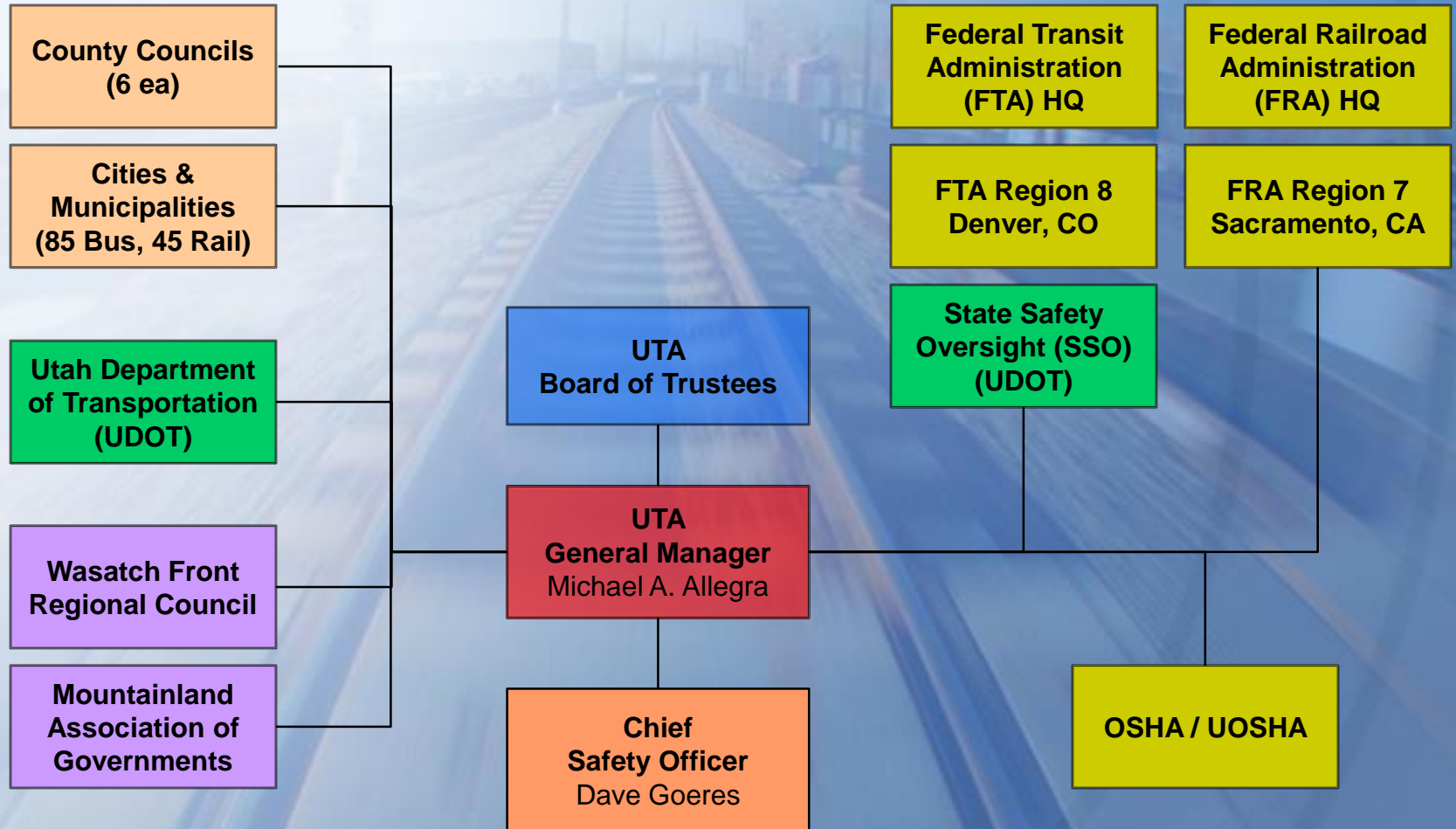
	% Comp	Lst Tme	Rcdabl	First Aid /mo
S-Line	92%	0	0	0
Tactile/Grade Crossing SGR	1%	0	0	0
MB Fuel Tanks	48%	0	0	0





# Coordination

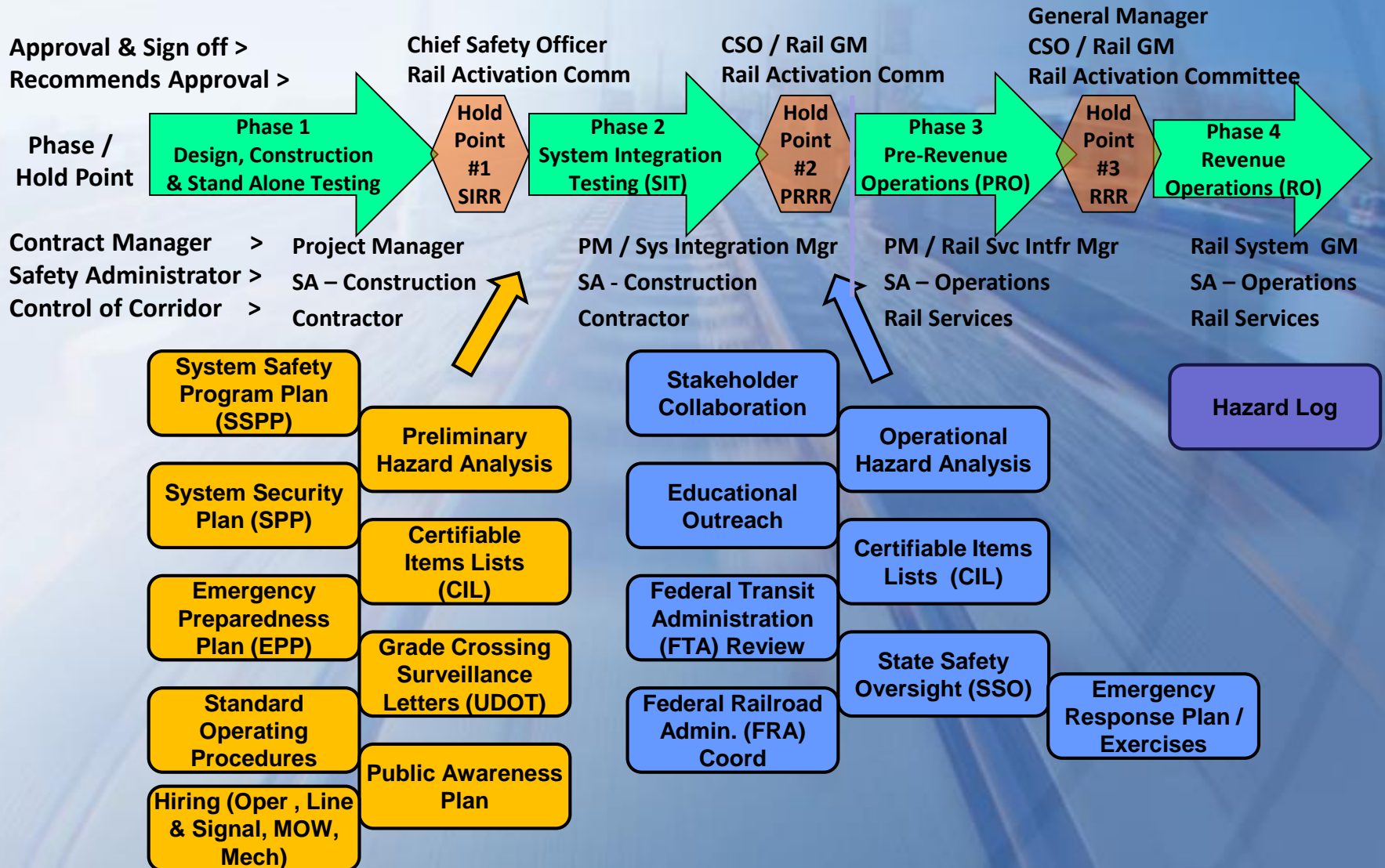
# Agency Coordination





# **UTA Rail Activation “Hold Point” Process**

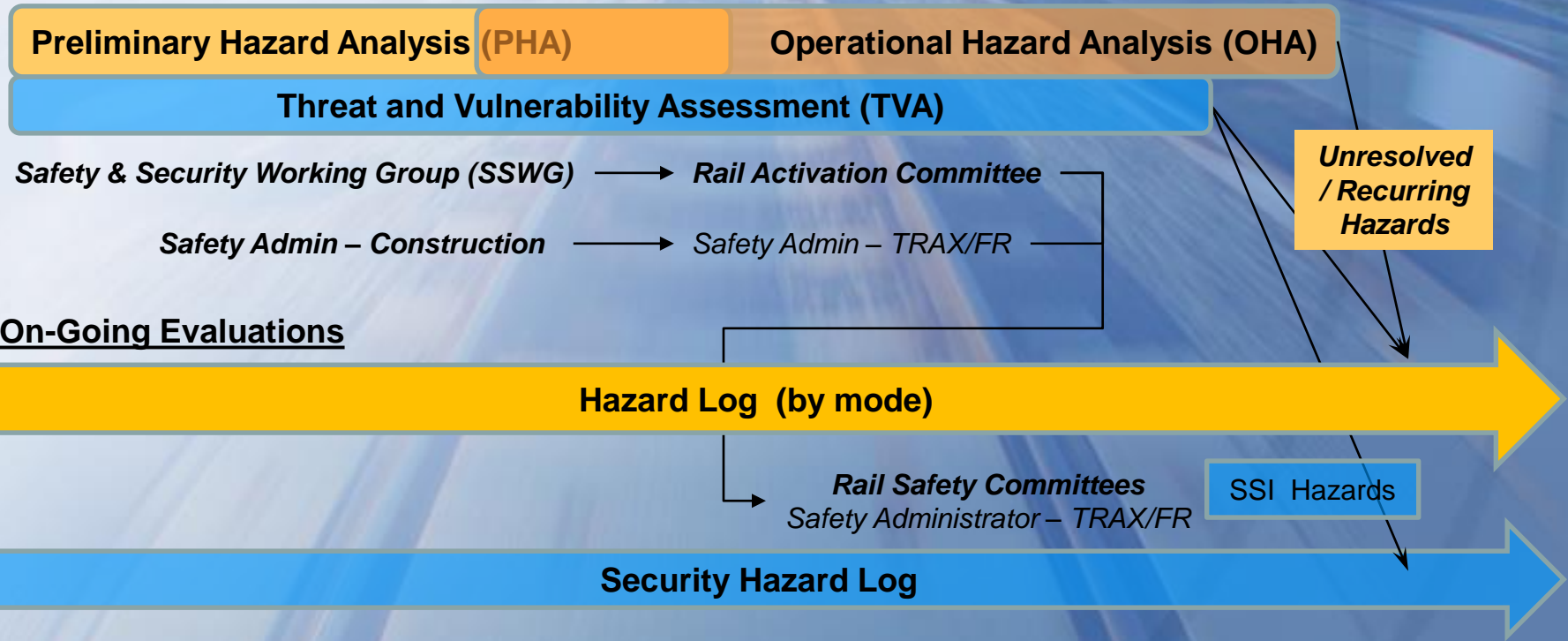
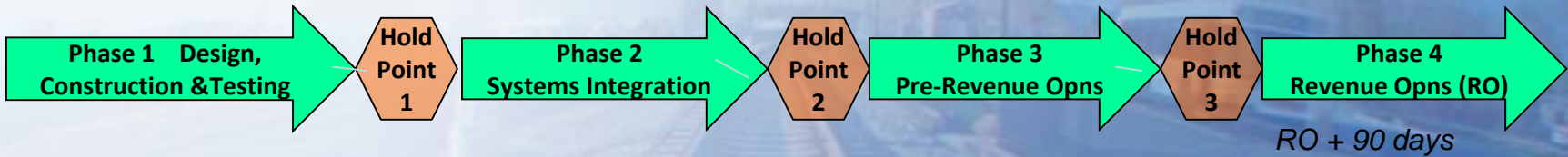
# UTA "Hold Point" Process



# Hazard Mitigation Process

## New Projects

### Project Delivery / Rail Activation Process







## 4 E's +

Eliminate

Engineer

Educate

Enforce +

Encourage

# Educate

- Safety Ambassador Blitzes
- “Train for Safety” Media Program
  - Train Wraps, TV, Billboard, Radio, Social media
- SL Tribune / Salt Lake Magazine Safety Articles
- Schools, Scouts, City Councils, COG Presentations
- Driver License Manual Update
- Operation Lifesaver Coordination
- Safety Management System (SMS)



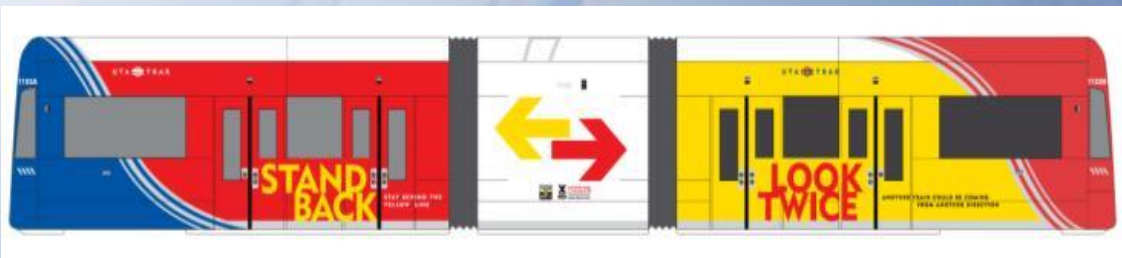
# Safety Messages

Red Lights Control the Grade Crossing

Stand Back, Behind the Yellow

Look Twice

See Something, Say Something



**DO NOT ENTER  
RAILROAD  
CROSSING WHILE  
RED LIGHTS  
ARE FLASHING**  
UTAH CODE 41-6A-1203

# Enforce + Encourage

- UTA Ordinances and State Statutes
- Joint enforcement with local police
- Safety Ambassador Blitzes
- Police in Hi-Visibility Uniforms
- Plain Clothes duty
- Public Safety (OLI) Class – UTA Police
- TSA Gold Standard Award



# Design Safety Focus

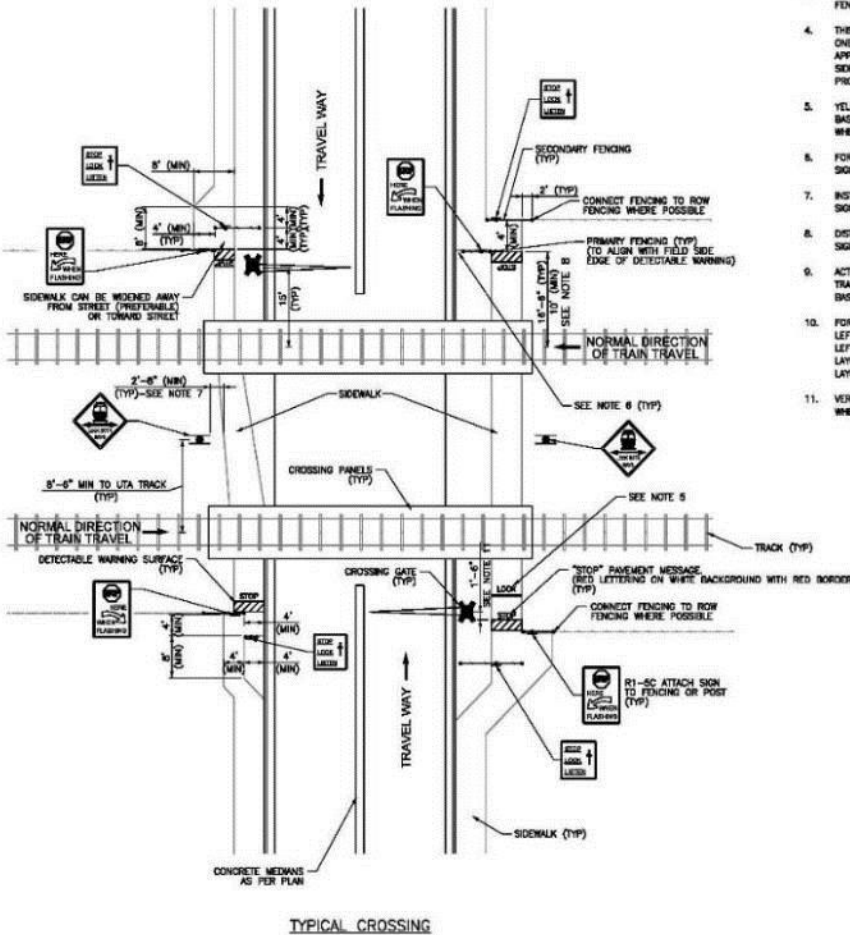
- Eliminate Straight Through Crossings
- Focus on the customer
- Hierarchy of protection
- Provide appropriate warnings
- Design Criteria / Guidebook

# Design Treatment Hierarchy

- *19.5.1 Passive Safety Treatments*
- 19.5.1.1 “Cross Only at Crosswalks”
- 19.5.1.2 “Stop For Trains” markings
- 19.5.1.3 Tactile Warning
- 19.5.1.4 “Look Both Ways” signage
- 19.5.1.5 Channeling
- 19.5.1.6 Pedestrian Barriers & signage
- 19.5.1.7 Swing Gates
  
- *19.5.2 Active Safety Treatments*
- 19.5.2.1 Ped Flashing Lights & Audible Warning
- 19.5.2.2 Gates crossing Sidewalk
- 19.5.2.3 LRV Activated Visual / Audio Warning



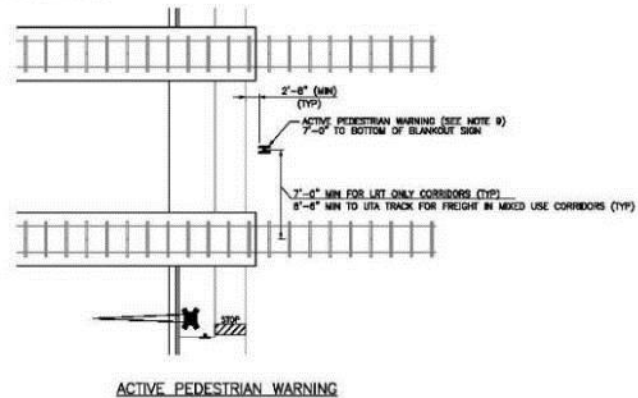
# UTA Pedestrian Grade Crossing Design



TYPICAL CROSSING

NOTES

- "STOP HERE WHEN FLASHING" SIGN TO BE INSTALLED ADJACENT TO DETECTABLE WARNING SURFACE (DWS). SIGN TO BE AFFIXED TO PRIMARY FENCING OR POST-MOUNTED WHEN FENCING NOT USED.
- "STOP" PAVEMENT MESSAGE TO BE INSTALLED ADJACENT TO, AND ON THE TRACK SIDE OF, DETECTABLE WARNING SURFACE.
- FENCING SHALL BE 42" BLACK VINYL-COATED CHAIN LINK FENCE, 2" GRID. INSTALL 2" REFLECTIVE STRIPPING ON EACH SIDE OF ALL FENCE POSTS INSTALLED NEXT TO, OR WITHIN, THE SIDEWALK.
- THIS STANDARD TO BE APPLIED TO CROSSINGS WHERE SIDEWALK IS CONTINUOUS THROUGH GRADE CROSSING OVER TRACKS. APPLY ONE OF THE FOUR QUADRANT APPLICATIONS SHOWN IN FIGURE. APPLICATION TO BE CHOSEN BASED ON CONFIGURATION OF APPROACHING SIDEWALK, WIDTH OF CROSSING, GATE LOCATIONS, AND ADJACENT ROW FENCING. WHERE THERE IS CONTINUOUS SIDEWALK ON ONLY ONE SIDE OF THE ROADWAY, THE MUTCO R9-3 SIGN SHALL BE INSTALLED ON THE NON-SIDEWALK SIDE TO PROHIBIT PEDESTRIAN CROSSING. ALSO SEE NOTE 10.
- YELLOW STRIPE AND "LOOK" PAVEMENT MESSAGE (YELLOW LETTERING ON WHITE BACKGROUND) TO BE INSTALLED IN ANY QUADRANT BASED ON ENGINEERING JUDGEMENT WHEN ADDITIONAL AWARENESS IS NEEDED DUE TO TRACK SKEW, LIMITED SIGHT DISTANCE, OR WHERE OTHER LOCATION-SPECIFIC CONDITION EXISTS.
- FOR SIGNS/FENCING INSTALLED ADJACENT TO ROADWAY, PROVIDE 1.5' MINIMUM CLEARANCE BETWEEN FACE OF CURB AND EDGE OF SIGN/FENCE.
- INSTALL POST-MOUNTED SIGNS WITH MINIMUM 2'-6" HORIZONTAL CLEARANCE AND 4" VERTICAL CLEARANCE. INSTALL FENCE-MOUNTED SIGNS WITH TOP OF SIGN AT TOP OF FENCE.
- DISTANCE OF DWS FROM TRACK CENTERLINE TO BE BASED UPON ENGINEERING JUDGEMENT AND TO PROVIDE MAXIMUM PRACTICABLE SIGHT DISTANCE OF ONCOMING TRAINS.
- ACTIVE PEDESTRIAN WARNING SHALL BE INSTALLED ON DESIGNATED SCHOOL ROUTES AND WHERE SIGHT DISTANCE UP AND DOWN TRACKWAY IS LIMITED OR SEVERE (AS DETERMINED IN UTA DESIGN CRITERIA). LOCATION OF ACTIVE PEDESTRIAN WARNING TO BE LOCATED BASED ON SIGHT SPECIFIC CONDITIONS TO MAXIMIZE VISIBILITY. "LOOK BOTH WAYS" SIGNS MAY BE MOUNTED ON SAME POLE.
- FOR LIGHT RAIL DOUBLE TRACK CORRIDORS THE PREFERRED LAYOUT IS TO HAVE THE PEDESTRIAN WALKING/TURNING RIGHT THEN LEFT SO THAT THEIR FIRST LOOK IS TO THE RIGHT FOR TRAINS APPROACHING ON THE FAR TRACK AND THEIR LAST LOOK IS TO THE LEFT FOR TRAINS APPROACHING ON THE NEAR TRACK PRIOR TO CROSSING THE TRACKS. IF IS ACCEPTABLE TO USE ALTERNATE LAYOUTS AS SHOWN IF THE SIDEWALK ARRANGEMENT OR RIGHT-OF-WAY WIDTH IS NOT SUFFICIENT TO ACCOMMODATE THE PREFERRED LAYOUT.
- VERIFY THAT GATE COUNTERWEIGHT IS 8" IN FRONT OF DWS. ADJUST 1'-6" DIMENSION ACCORDINGLY TO PROVIDE 6" CLEARANCE WHEN GATE IS IN DOWN POSITION.



ACTIVE PEDESTRIAN WARNING

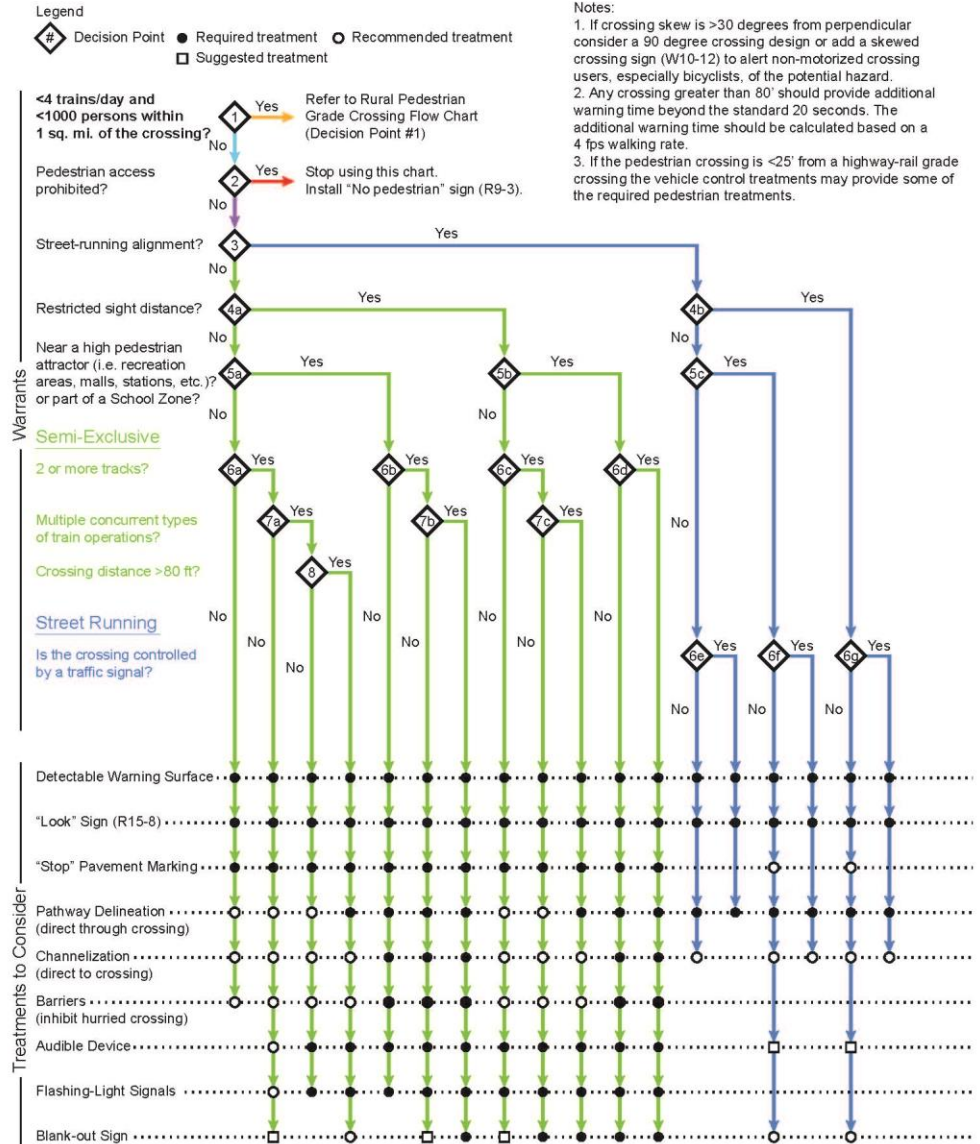
GENERAL GUIDELINES FOR AT-GRADE  
PEDESTRIAN SIDEWALK CROSSING  
SAFETY TREATMENTS (LIGHT RAIL)  
JULY 17, 2012



# Design Manual

## UDOT Pedestrian Grade Crossing Manual 2013

### Urban Pedestrian Grade Crossing Flow Chart



This flow chart is a companion to the UDOT Pedestrian Grade Crossing Manual. It is intended as a tool to guide designers in the selection of appropriate control devices at pedestrian grade crossings. Final treatment selection should be determined through an engineering study.



# Sidewalk Crossing Treatments



- Fencing, Tactile
- Markings, Signs
- LBW Flashing

# Design Safety - Bicycles

Airport TRAX - 600 West / North Temple



# Results

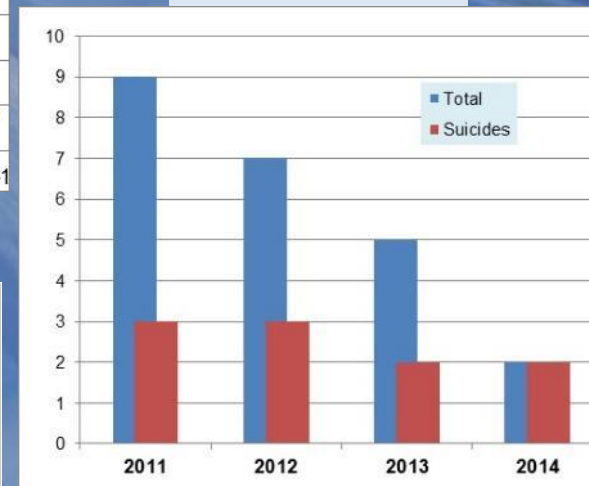
- 131 corporate hazards and 184 local hazards identified and closed in 2013.
- Safety Comm mtgs up 4 x
- Accidents in all modes reduced
- Accident rates in all modes down 24-74%
- Fatalities down 78% over 3 years
- FTA “best practices” for Hold Point process and Emergency Exercises
- 15 safety audits with no findings
- 4 rail activations in 1 year
- Standard Safety Treatments
- Better integrated and effective safety

# Results

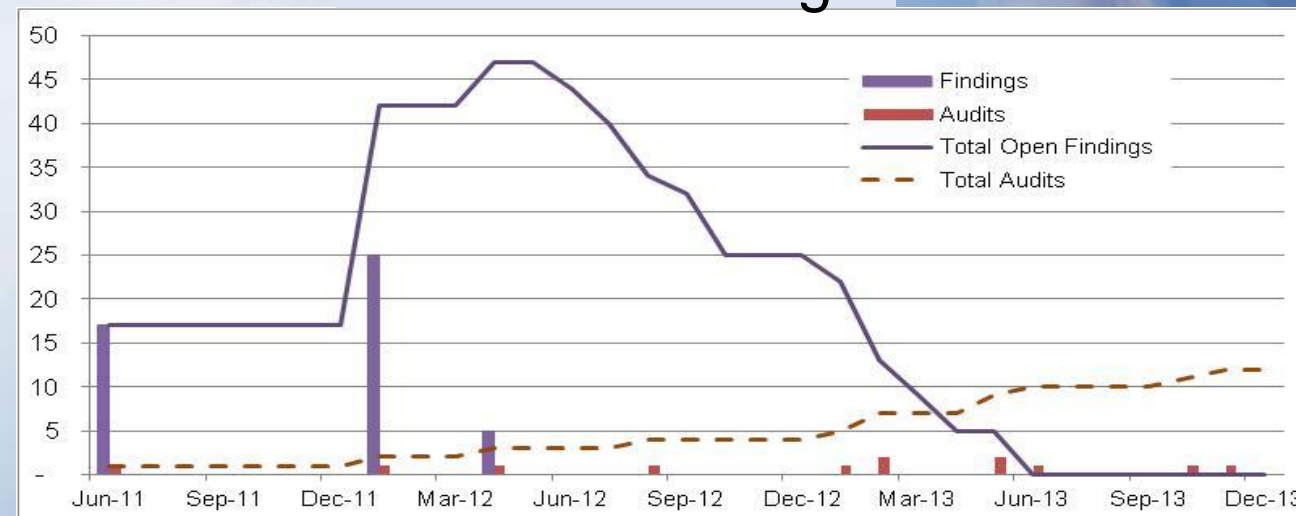
## Light Rail Accident Rate



## Fatalities



## Audits & Findings



# Take Aways

- Establish, Organize and Elevate Safety
- Encourage, reaffirm, energize
- Track and mitigate hazards
- Assign responsibility and accountability
- Establish, implement and review standard safety treatments
- Establish, implement and follow process for activation
- Start with the end in mind (Covey)

**Train Day in Utah - May 10, 2014  
145<sup>th</sup> Anniversary of the Driving  
of the Golden Spike**



**Salt Lake City  
21-25 June 2015  
APTA Rail Conference**

Photo illustration by COLIN BRALEY/Standard-Examiner