

New Initiative Needed to Prevent Railroad Trespassing & Suicides

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- Association of American Railroads
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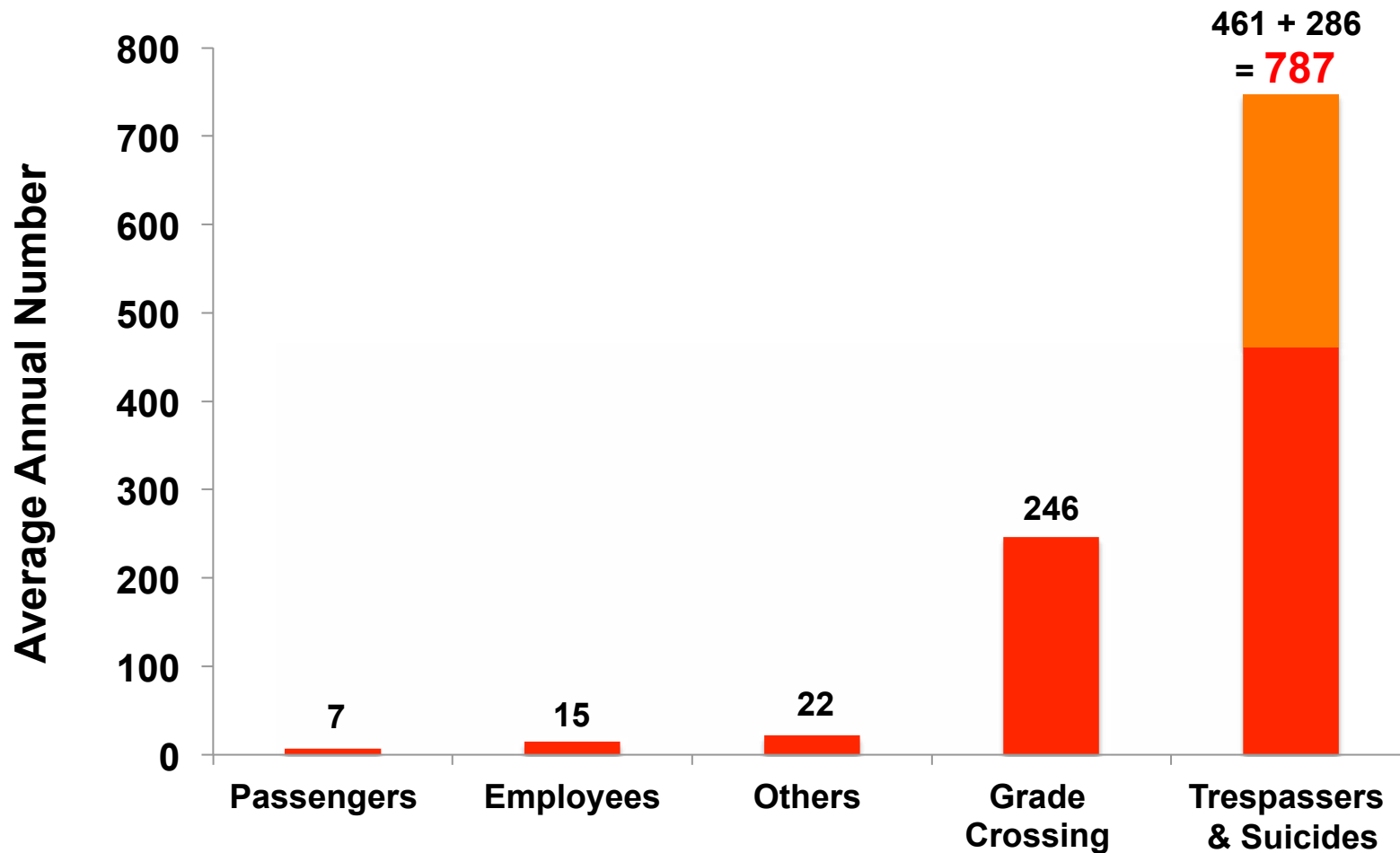


Presentation Outline

- Causes of railroad fatalities
- Trends in railroad safety
- Institutional successes & challenges
- Further understanding is essential to effective solutions
- Macro and micro-level risk based approach
- Technology options to quantify
- Pokémon Go: a new threat (*and a new opportunity?*)
- Possible path forward



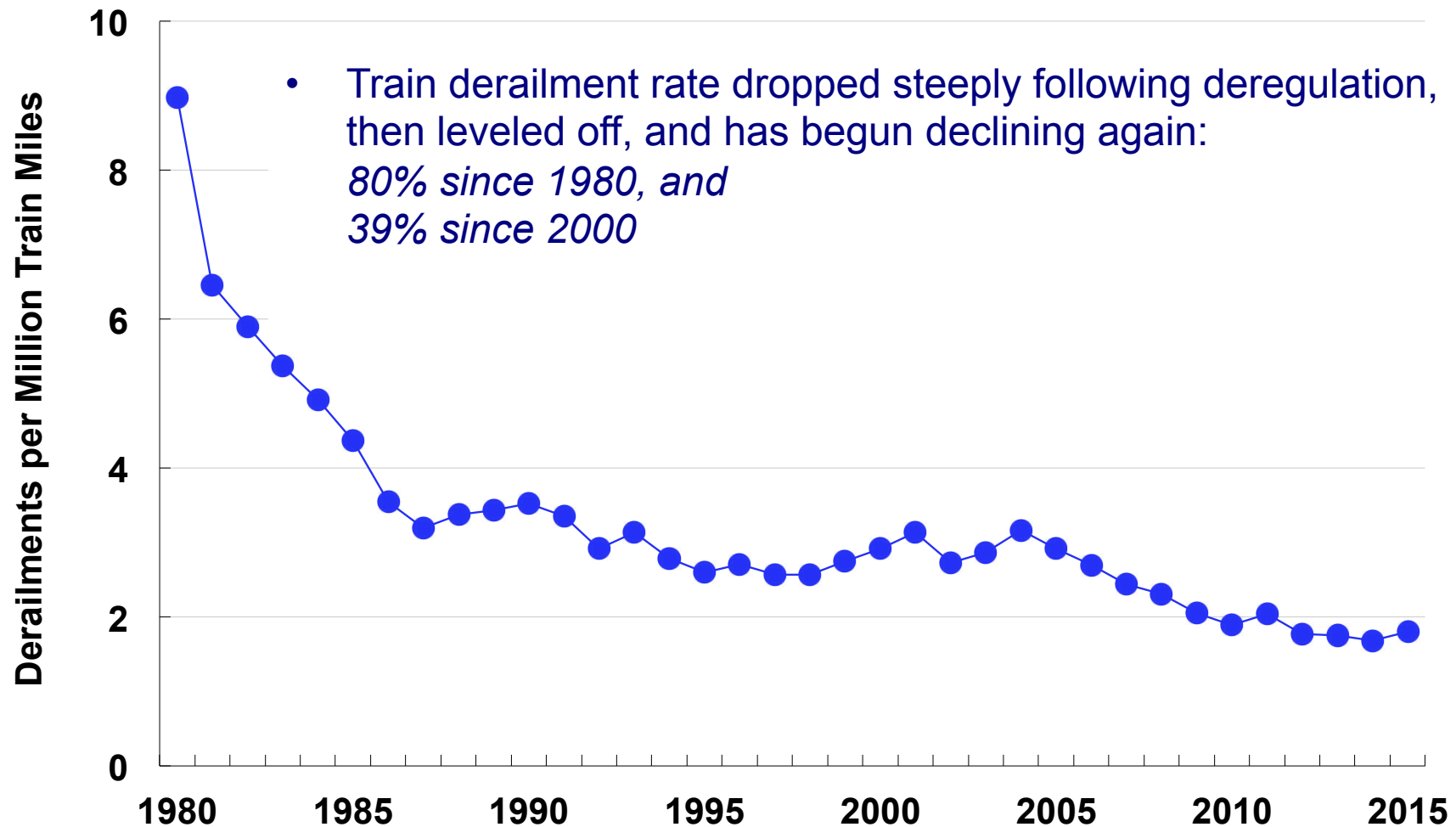
Cause Distribution of U.S. Railroad Fatalities



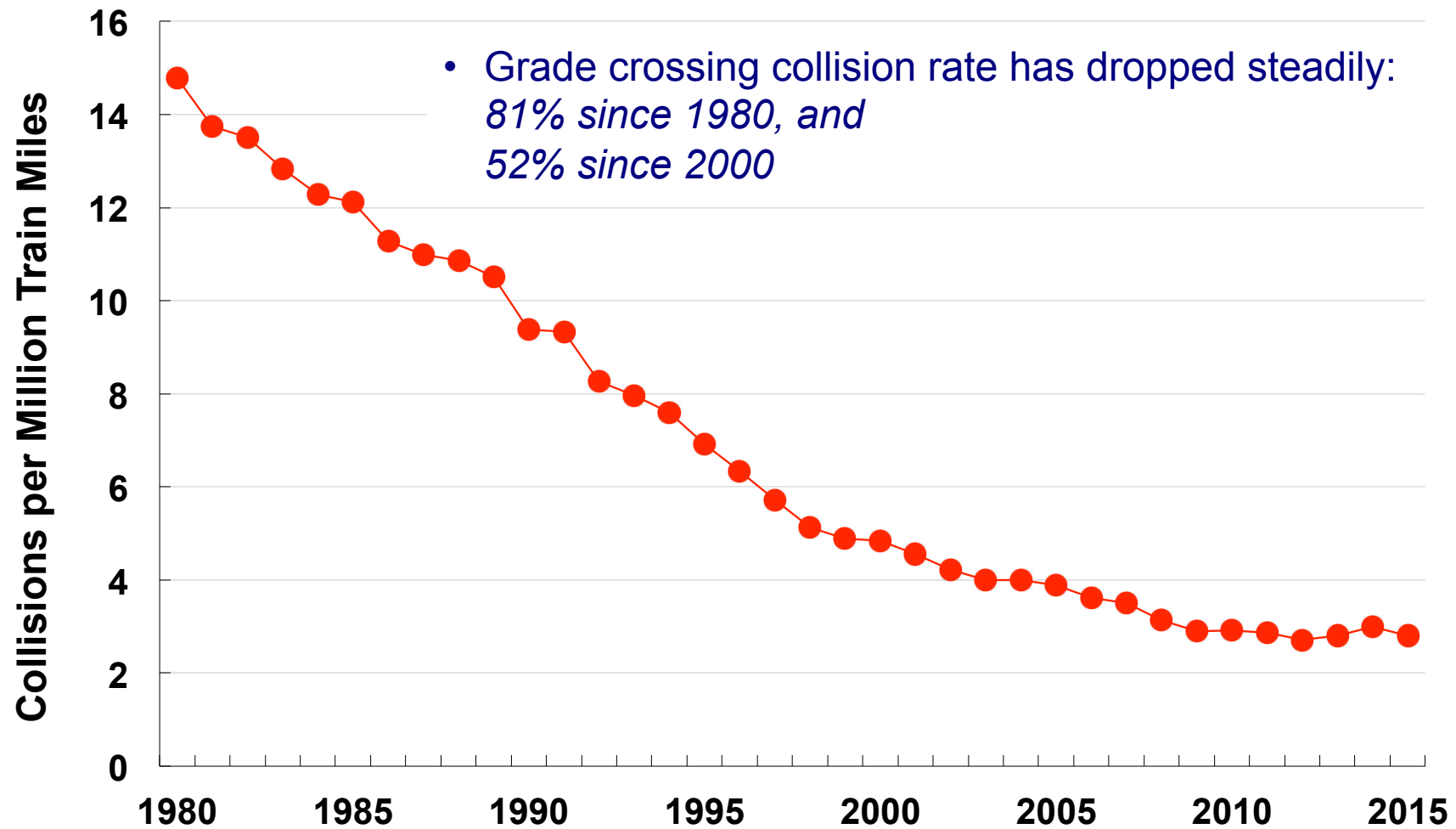
- Five year averages



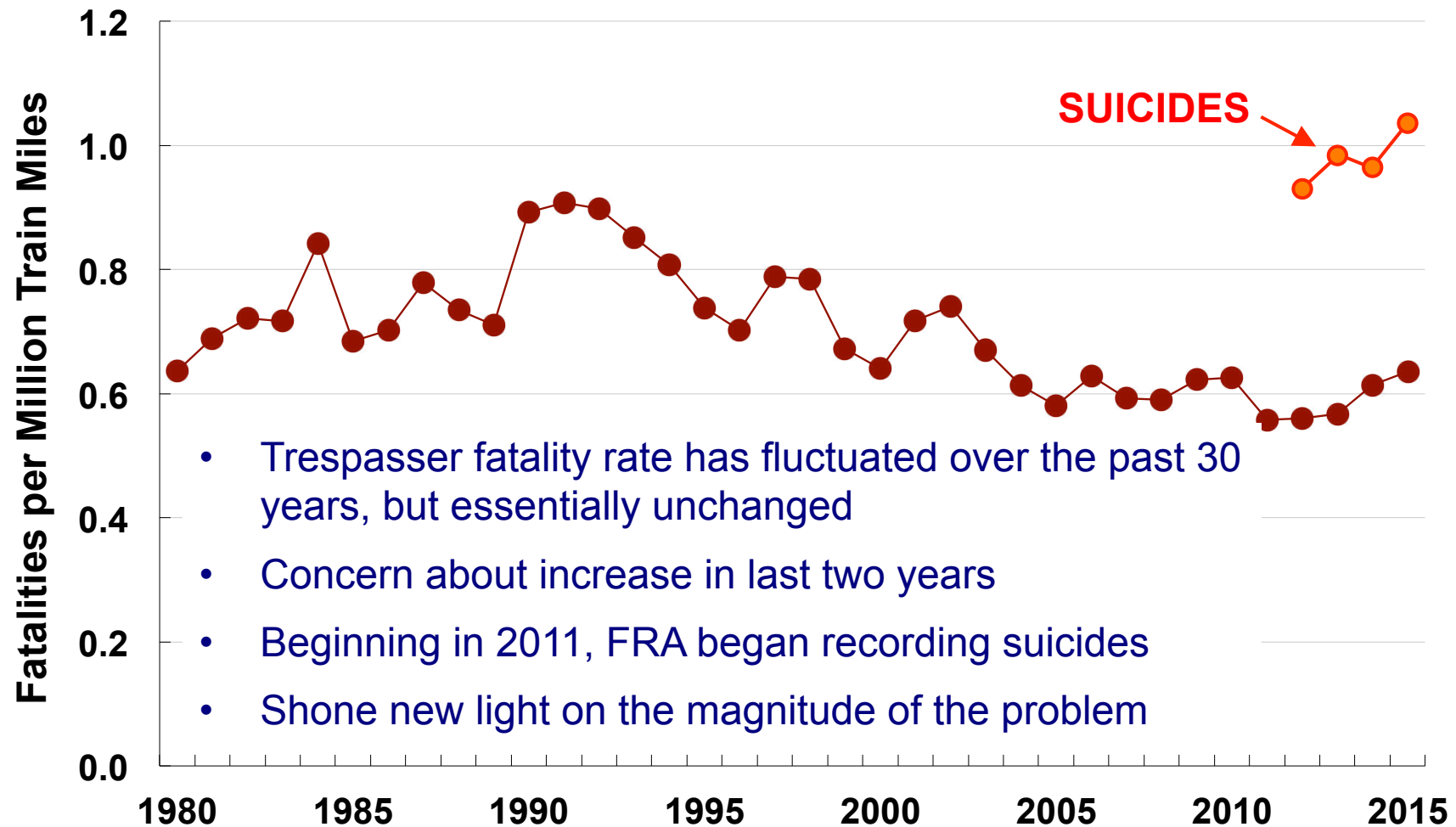
25-year decline in railroad derailment rate



25-year decline in grade crossing collision rate



No significant progress in trespasser fatalities



Why so much progress in train derailments and grade crossings, but not trespasser/suicides?

- **Institutional**

- Railroads control most causes of derailments
- Railroads and highway departments have long-established, relationships and protocols for grade crossing safety
- Complex set of stake-holders for trespassing and suicide prevention and no thoroughly unified approach

- **Technical**

- Railroads have deep, well-established understanding of operating safety protocols and safe designs for infrastructure and rolling stock
- Railroads and highway departments have a well-established set of standards for warning systems and prioritization of installation
- Incomplete understanding of problem and the effectiveness of feasible technical solutions



Why so much progress in train derailments and grade crossings, but not trespasser/suicides?

- **Organizational**

- Coordinated commitment to R&D by AAR, FRA and railroads
- Coordinated commitment through Operation Lifesaver, Inc. (OLI)
- Trespassers are part of OLI mission, but should this be expanded?

- **Funding**

- Railroads have inherent financial interest in derailment prevention
- Dedicated Section 130 funding for grade crossing safety improvement
- No dedicated funding source to address the problem

- **“Ownership”**

- Railroads “own” derailments
- Railroads and highway departments “own” grade crossings
- Who “owns” trespasser and suicide problem?



Railroad safety & technology research and investment

- Systematic, data-driven approach to railroad safety R&D and investment
 - Analysis of FRA, AAR, and railroad data
 - Coordinated, pro-active, R&D program addressing most-important topics
 - Improve component and system designs
 - Develop new technologies
 - Extensive investment in most promising approaches
- Parallel success with highway-rail grade crossing safety
 - Decades of research to understand problem
 - Development of engineering solutions and new technologies
 - Strong, coordinated focus on educational programs
 - Quantitative models to identify highest risk crossings
 - Prioritized investment in engineering, education and enforcement of grade crossing safety



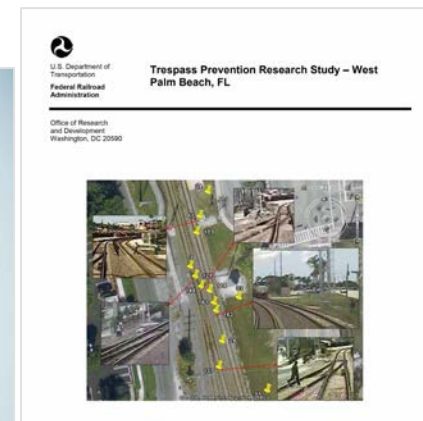
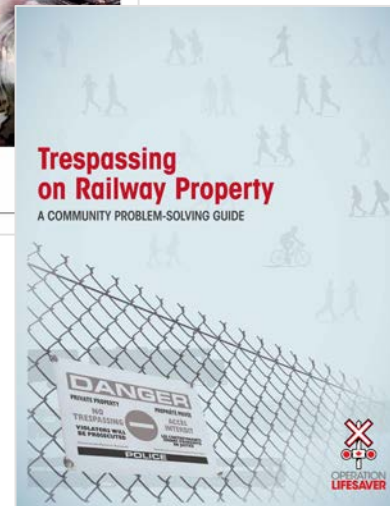
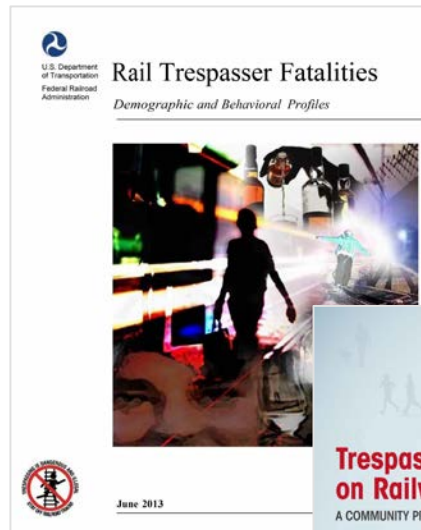
No comparable parallel focus to solve trespasser/suicide problem

- OLI and others have made this a substantial focus of their efforts
- FRA and others have conducted useful and informative research
- But the data speak to the need for something *new, additional* or *different* than previous efforts
- We are doing the same thing but hoping for a different outcome
- We need to change our approach to this problem
 - More implementation
 - Smarter application
 - New solutions



- Trespasser problem has multiple dimensions
- Where are they?
 - Stations
 - Grade crossings
 - Along ROW
- Who are they?
 - Passengers
 - Pedestrians
- Why are they there?
 - Pedestrians
 - Barrier to cross
 - Path to destination
 - Destination
 - Loitering and socializing
 - Impaired – Judgment affected by drugs or alcohol
 - Homeless & hoboes
 - Malicious – theft or vandalism
 - Suicidal – use railroad to inflict harm on one's self

Effective Solutions Require Understanding the Problem



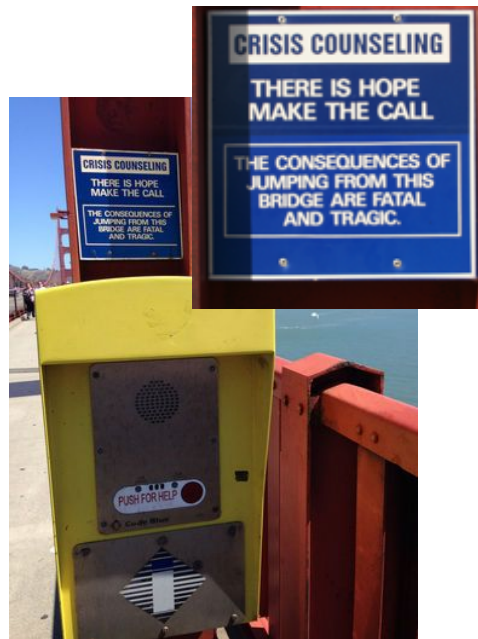
What is the role of technology?

- Detection
- Quantification
- Prevention
- Mitigation



Trespassing versus Suicide

- Problems are related in some ways but highly distinct in others
- Some types of preventive measures may address both problems, but others will only help one or the other
- These distinctions must be understood when evaluating which solutions to use and under what circumstances



Havârneanu et al review and analysis of literature on railroad trespasser & suicide prevention

- Havârneanu with the International Union of Railways
- Conducted an extensive review of the literature
- 139 publications ranging from 1978 to 2014

Accident Analysis and Prevention 81 (2015) 30–50



Contents lists available at ScienceDirect

Accident Analysis and Prevention

journal homepage: www.elsevier.com/locate/aap



A systematic review of the literature on safety measures to prevent railway suicides and trespassing accidents

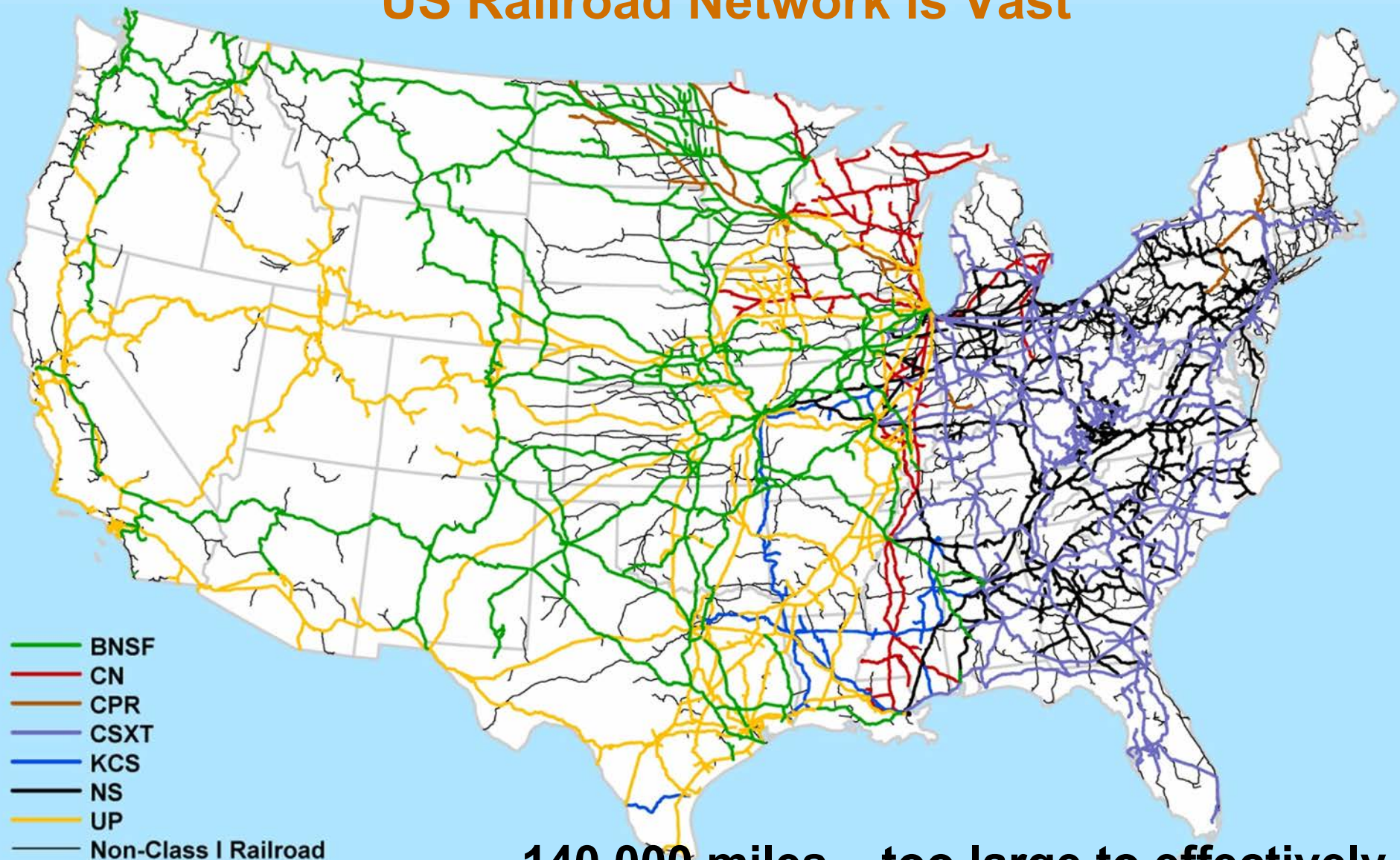


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US Railroad Network is Vast



Association of American Railroads
Policy and Economics Department
Washington, D.C. 20001

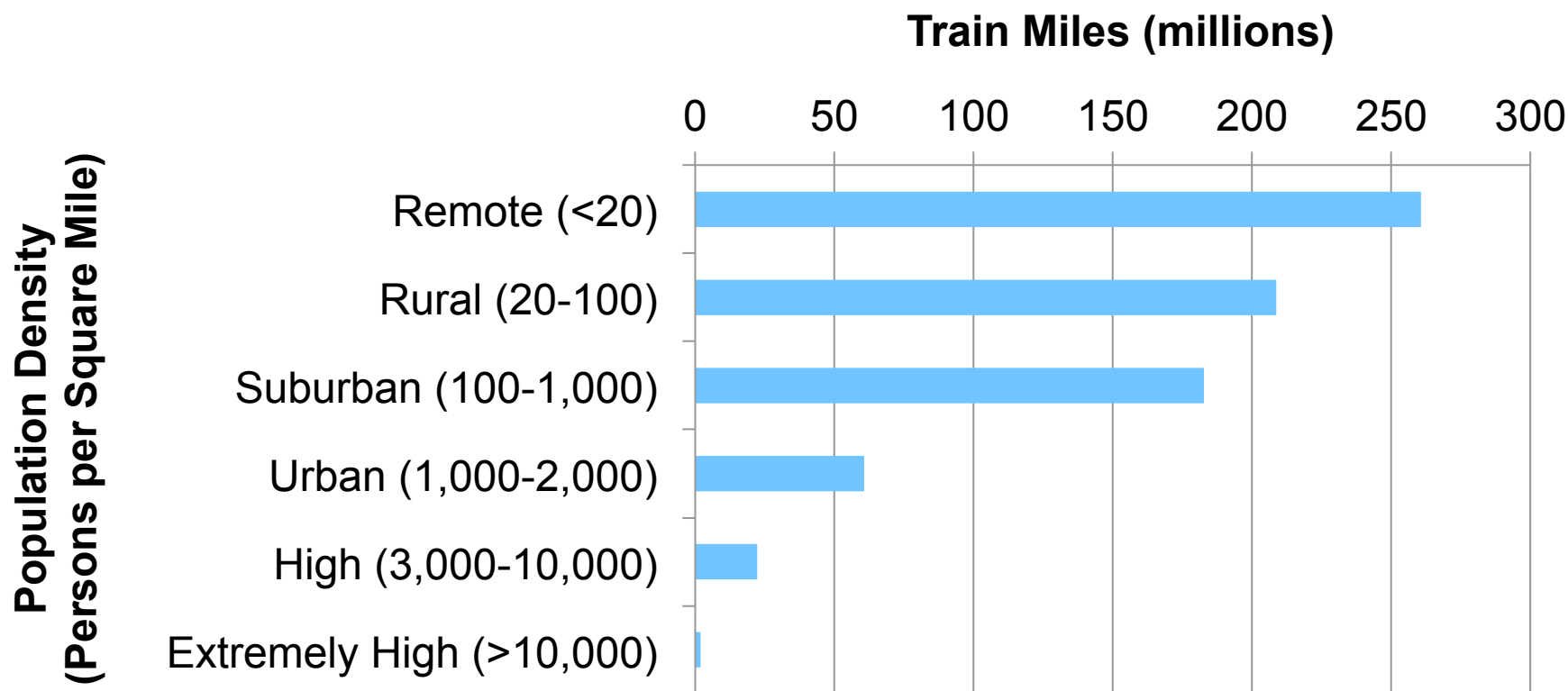
**140,000 miles – too large to effectively
patrol & prevent trespassing**

Where do we allocate resources?

- Risk-based approach needed
- First step geographical - must understand where the problem occurs
 - **Macro** – Statistical analysis of network level factors affecting trespass occurrence and incidents
 - GIS analysis of trespasser & suicide incidents
 - Need precursor data, where & when do “near hits” occur?
 - Develop technology to automatically identify and geocode
 - Identify areas and predictive factors requiring more detailed analysis
 - **Micro** – Focused analysis of specific local conditions
 - Where, when & why occurring
 - What factors affecting
 - Targeted prevention and mitigation



Estimate* of population density exposure to U.S. railroad train traffic



* This distribution is derived from a different, prior study and is presented here for illustration purposes and It should not be considered representative. A new, up-to-date investigation is planned



Front-facing locomotive cameras

Photos credit: Union Pacific Railroad



- Can this technology be adapted to quantify trespasser occurrences?



Front-facing locomotive cameras

- Develop machine-vision algorithms to detect trespassers
- Integrate with GPS location info
- Automated quantification of trespasser locations
- Identify “hot spots” for prioritized prevention and mitigation



	A	B	C	D
1	1	Cinetta PETCin	Our dog Fetch is by all means our loyal mascot. He was first drawn in concept and	
2	2	1 Art Lobster	Gourmet Art! You best be getting harder and harder to find an available unit for a	
3	3	1 Print Bigprints	The iPrint character, as with our other creations was first conceived on paper and th	
4	4	1 Print Bigprints	www.cinetta.com/our-services/3d-rendering/3d-rendering-services/3d-rendering-services/	
5	5	1 GarSnapping	va http://http://www.gar snapping.com targete, blank renderfulfill the vision of a	
6	6	1 STP Garage	Here is an example of a rendering which saved the client a lot of grief and hassle.	
7	7	1 STP Clock Display	3D Render of an Indoor Display for the STP Clocks	
8	8	1 STP Flag Clock	3D Render of an STP clock for marketing purposes	
9	9	1 STP Flame Clock	3D Render of an STP clock for marketing purposes	
10	10	1 STP Resistor Clock	3D Render of an STP clock for marketing purposes	
11	11	1 First Alert Flashlight	Do you need to show someone your product before its made? No problem! our 3D	
12	12	1 First Alert Flashlight Pack	Do you need to show someone your product before its made? No problem! our 3D	
13	13	1 First Alert Trade Show Booth	With our 3D skills Cinetta Design can help you showcase your full line of products	
14	14	1 First Alert Digital Series	With our 3D skills Cinetta Design can help you showcase your full line of products	
15	15	1 First Alert Camera	Do you need to show someone your product before its made? No problem! our 3D	
16	16	1 First Alert New Pan and Tilt C	Do you need to show someone your product before its made? No problem! our 3D	
17	17	1 First Alert New Pan and Tilt C	Do you need to show someone your product before its made? No problem! our 3D	
18	18	1 Homeland POS	With our 3D skills Cinetta Design can help you showcase your full line of products	
19	19	1 Homeland POS	With our 3D skills Cinetta Design can help you showcase your full line of products	
20	20	1 Homeland POS	With our 3D skills Cinetta Design can help you showcase your full line of products	
21	21	1 Wew Socks For Kids	Wew Socks for kids! Just what they need. Wew, doesn't it look good. It was crea	
22	22	1 Andry Boykin	This is a logo for an incredibly motivating speaker. Need help with your business, it	
23	23	1 Pitata Ole	Here's a cool 3d Logo we developed. It's almost finished but our partner never can	
24	24	1 Black and white Coffee	We Designed both the package and the logo for this coffee brand. It's a high-end	
25	25	1 Cinetta Gas Nozzle	Do you need FUEL for your business? Here at Cinetta Design we can give just what	
26	26	1 Cinetta Energy Drink	Do you need FUEL for your business? Here at Cinetta Design we can give just what	
27	27	1 Cinetta Car	Here is a 3d example of a car wrap. What better way to advertise your business th	
28	28	1 Cinetta Keys	At Cinetta Design we can give you the keys to unlock the potential in your busines	
29	29	1 International Rotary	Here's an example of a logo we did pro-bono for the Weston Rotary. Support your	
30	30	1 Mr. Remote	Did you lose your original control remote? Mr. Remote can help you find what you're	
31	31	1 Black Tanning	This is a package is an example of a design and rendering developed for Pro brai	
32	32	1 Cosmo Tini	This is a package is another example of a design and rendering developed for Pro	
33	33	1 House	Who wouldn't want to know what their house will look like before its built. Here is a	
34	34	1 Town of Davis Nature Center	Architectural visualization for the Nature Center design for The Town Of Davis	
35	35	1 Town of Southwest Ranches	Architectural visualization of bridge designs for The Town Southwest Ranches. We	
36	36	1 Town of Southwest Ranches	This is one of a number of renderings of the bridge	
37	37	1 Town of Southwest Ranches	This is one of a number of renderings of the bridge	
38	38	1 Town of Southwest Ranches	This is one of a number of renderings of the bridge	
39	39	1 Town of Southwest Ranches	This is one of a number of renderings of the bridge	
40	40	1 Town of Southwest Ranches	This is one of a number of renderings of the bridge	
41	41	1 Town of Davis Dykes Rd.	Architectural visualization for Dykes Rd.	
42	42	1 Town of Davis Park	Architectural visualization of park designs for The Town Of Davis	
43	43	1 Town of Davis Signs	Architectural visualization of signage designs for The Town Of Davis	
44	44	1 Town of Davis Trail	Park trail map designs for The Town Of Davis	
45	45	2 US Coast Guard	We did this logo for the Coast Guard Ft. Lauderdale Station. Although we did it pro	

Photo credit: FRA Trespass Prevention Research Study – West Palm Beach, FL



Localized detection & monitoring technologies

- Surveillance (personnel or CCTV)
- Automated intrusion detection technologies: fences, visual, infrared, etc.
- UAVs - offer a whole new set of opportunities for detection (and possibly deterrence as well)



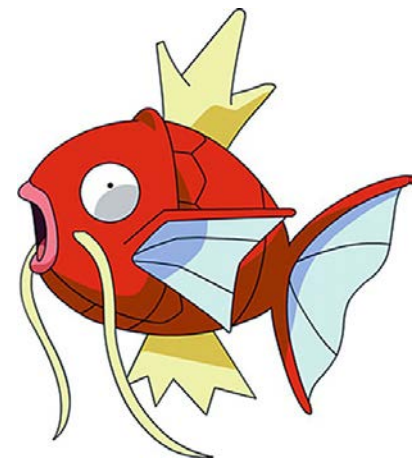
Pokémon Go: A new hazard

- Pokémon Go (“Augmented Reality” game) has created a new incentive to trespass
- Players chasing Pokémon have been found trespassing on railroad tracks and entering railyards
- FRA and AAR wrote a joint letter to Niantic Labs CEO (Pokémon Go creator) requesting that they seek ways to discourage unsafe behavior near railroad tracks



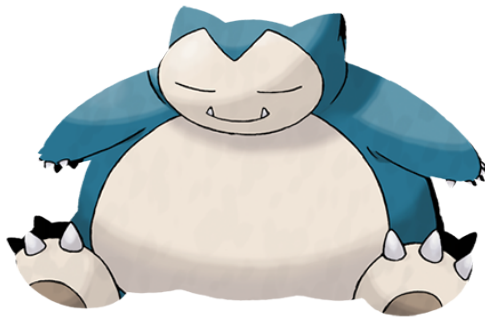
Pokémon NO!

- Can Pokémon Go be used to discourage railroad trespassing?
- Challenged some Pokémon players for some ideas
 - Developer should never place any game feather on railroad property
 - Railroad routes and affected areas could be marked in red on the Pokémon Go map, so players can easily see them
 - Disable Pokémon App when too close to railroads including when crossing tracks at grade crossings
 - If a player gets too close to a rail line an audio and visual alarm would alert the player
 - If the player does not depart they will lose a Pokémon buddy or downgrade their level



Pokémon YES!

- Positive incentives as well
- A reward policy could be set up
 - When a player finds a rail route or rail area not marked on the Pokémon Go map, they can report it
 - They will have a chance to choose a new Pokémon they do not own, or get Pokémon candy



- More generally, are there ways we can use personal device technology to help with the trespasser/suicide problem?



A Cliché, a Corollary and an Approach

- No “Silver Bullets”
 - Complex, multi-faceted problem – no one or two solutions will solve it
- Perfect is the Enemy of the Good
 - We should not shy away from implementation of partial solutions
- But we must be “*data-driven*” in search of the most effective solutions
- Develop, risk-based approach that can be effectively adapted to local conditions
- FRA, AAR, OLI, APTA, FTA, State agencies and others should take leadership in understanding problem, developing solutions and *assisting communities to implement them*



New Initiative

- Interdisciplinary Task Force to thoroughly understand problem and develop suite of solutions – both general and contextual
- Leadership and expertise in:
 - Railroad engineering, transportation and casualty prevention
 - Human factors
 - Psychology
 - Law enforcement
 - Pedestrian safety
 - Drug and alcohol
 - Risk analysis
 - Communities
 - Education & educators
 - Urban and community planning
- *Sustained funding, implementation and ongoing follow-up essential*



Thank You

Questions and Discussion

