
State of the Program Address

RailTEC Infrastructure Research Program



FRA and FTA Industry Partners Meeting

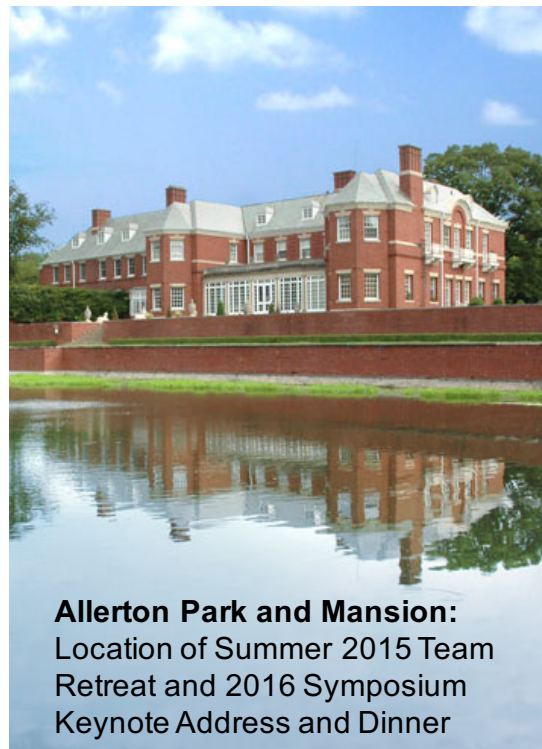
4 November 2015 – Tucson, AZ

Riley Edwards, Marcus Dersch, Yu Qian, and Matthew Csenge



Outline

- Introduction
- Vision and Objectives
- Pyramid
- Current Projects, Sponsors, and Team
- Research History Timeline
- Students, Presentations, and Publications
- Accomplishments
- Growth Areas
- Path Forward
- Questions and Comments



Allerton Park and Mansion:
Location of Summer 2015 Team
Retreat and 2016 Symposium
Keynote Address and Dinner

Infrastructure Research Team

- **Previous Personnel**

- 16 Graduate Research Assistants (Zeman, Gutierrez, Kernes, Shin, Grasse, Rapp, Shurpali, Van Dyk, Bizarria, Manda, Van Dam, Williams, Zhang, Chen, Greve, Csenge)
- At least 20 Undergraduate Research Assistants
- 1 Post Doctoral Researcher
- 1 Manager of Field Instrumentation
- 1 Research Engineer (Kernes)

- **Current Personnel**

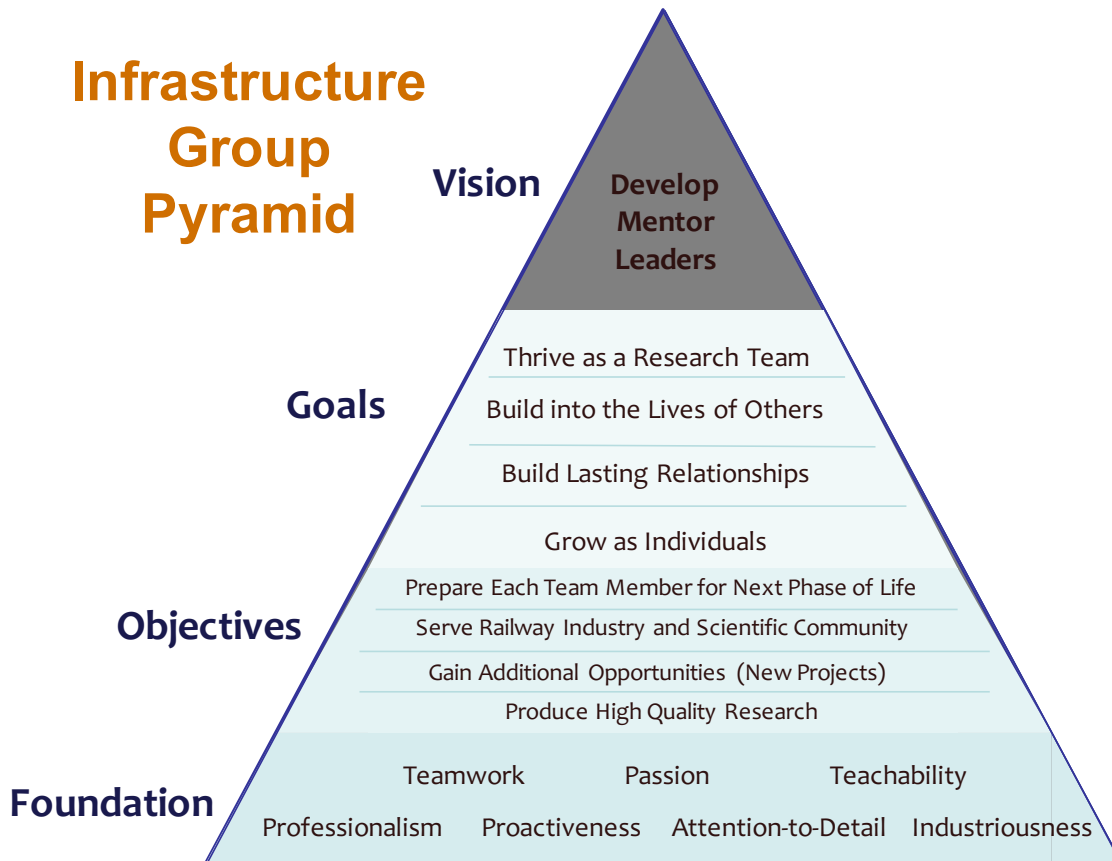
- 12 Graduate Research Assistants
- 8 Undergraduate Research Assistants
- 1 Manager of Experimentation
- 1 Senior Research Engineer
- 1 Research Engineer
- 4 Principal Investigators (PIs)

Infrastructure Research Team – May 2015

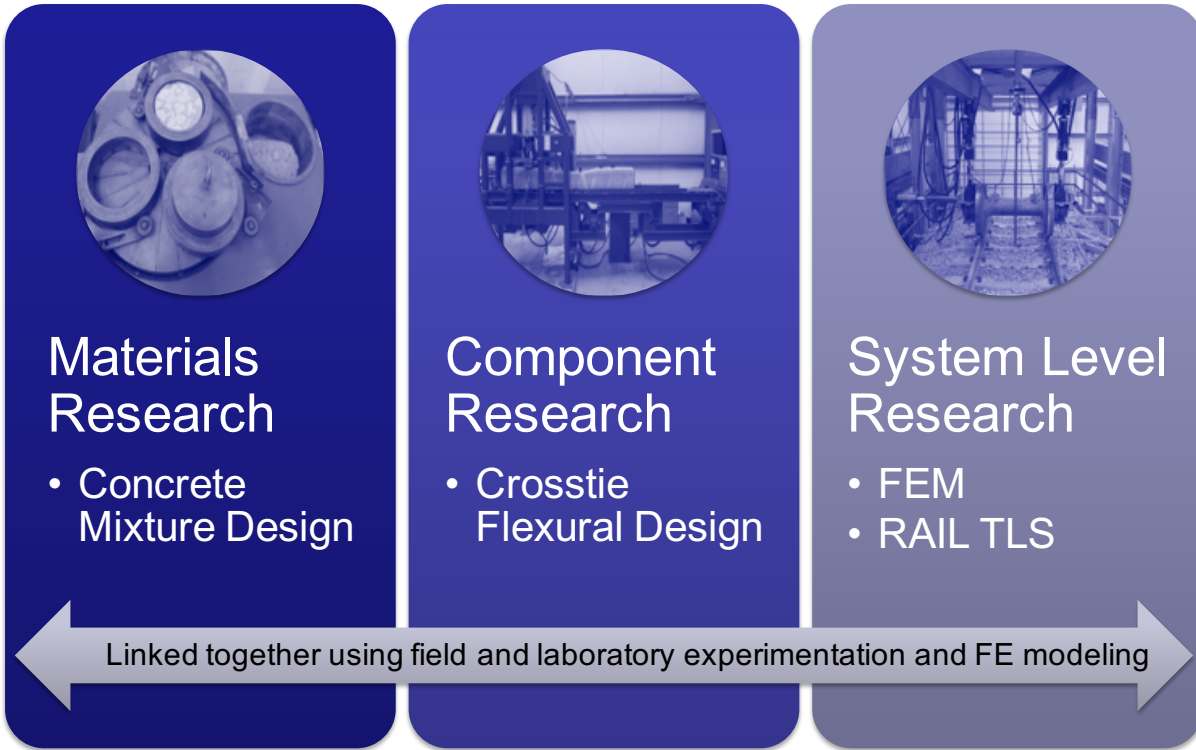


Infrastructure Program Objectives

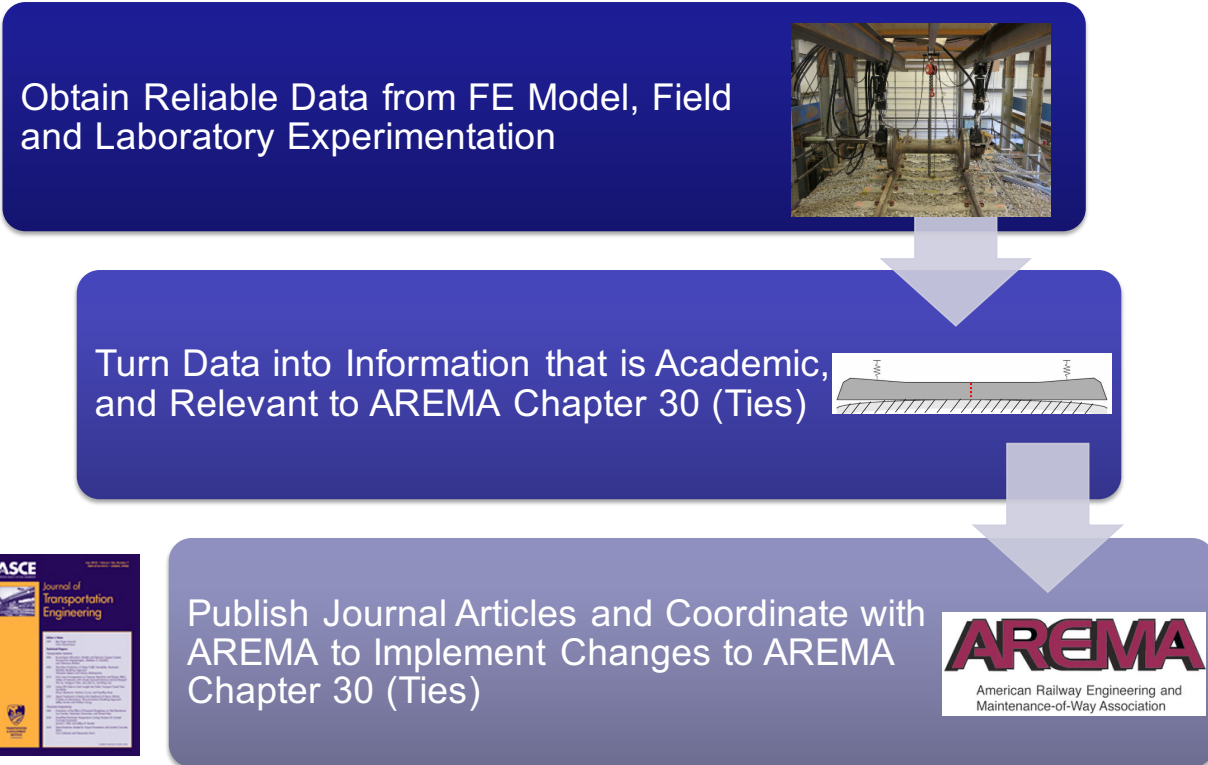
- Solve real-world design and performance challenges associated with railway infrastructure and its components
- Strive for a healthy balance of materials, component, and system-level research and testing projects
- Meet railroad industry and University objectives
- Intentionally mentor students and foster interest in the subject, training future leaders in the fundamentals of rail engineering



Program Elements and Integration



Program Flow and Implementation of Results



Current Infrastructure Research Sponsors



U.S. Department of Transportation
Federal Railroad Administration



U.S. Department of Transportation
Federal Transit Administration

- Federal Railroad Administration (FRA), Federal Transit Administration (FTA), and NURail Center (Crosstie and Fastening System Design, Performance, Wear, Fatigue, Cracking, Environmental, etc.)
- Amsted RPS (Fastening System Wear and Fatigue)
- GIC (Improved Concrete Crosstie Design)
- RAIL.ONE (Improved Concrete Crosstie Design)
- Union Pacific Railroad (Field Performance of Concrete Crossties)
- Vossloh (Fastening System Load Transfer)
- New York City Transit (NYCT) (Bolted Joint Modeling and Experimentation)



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New York City Transit

RailTEC Infrastructure Group Field and Laboratory Experimentation Locations



RailTEC Infrastructure Group

Field and Laboratory Experimentation Locations



Research Program Timeline

- 2008 August** – Hired First Graduate Research Assistant (John Zeman)
- 2008 October** – Attendance at First AREMA C-30 Meeting in Savannah, GA
- 2009 January** – First Research Project (CN and AAR funding)
- 2009 August** – Hired Second Graduate Research Assistant (Mauricio Gutierrez)
- 2009 October** – Second Research Project (Amsted RPS funding)
- 2010 August** – Hired Third Graduate Student (Ryan Kernes)
- 2011 January** – Hired Full-Time Research Engineer (Marcus Dersch)
- 2011 January** – Third Research Project (NEXTRANS Co-Funding)
- 2011 June** – FRA Tie and Fastener BAA awarded (Hired Graduate Research Assistants (Sihang Wei, George Chen, Justin Grasse, and Brandon Van Dyk)
- 2011 Summer** – Hired Graduate Research Assistants for Amsted RPS and NEXTRANS Projects (Chris Rapp and Amogh Shurpali)
- 2012 January** – Hired Postdoctoral Researcher (Moochul Shin)
- 2012 Summer** – Hired Second Research Engineer (Ryan Kernes) and Graduate Research Assistants (Thiago Bizarria, Emily Van Dam, and Brent Williams), **Two Additional FRA BAA Projects Awarded**

Research Program Timeline (Cont.)

2013 Spring – FRA BAA Modification #2 Awarded

2013 Summer – Hired Graduate Research Assistants for Amsted RPS and FRA Tie and Fastener BAA Projects (Matthew Greve and Kartik Manda) and FRA BAA Modification #3 Awarded

2013 Fall – Hired Graduate Research Assistants Matthew Csenge and Andrew Scheppe, GIC Project Awarded

2014 Spring – Hired Graduate Research Assistant Henry Wolf, Marcus Dersch Promoted to Senior Research Engineer, IntegriCo Project and FRA RSD Projects Awarded

2014 Summer – Hired Graduate Research Assistants Bosco Munyaneza and Donovan Holder

2014 Fall – Hired Graduate Research Assistants Kaijun Zhu and Josue Bastos, Hired Research Engineer Yu Qian, NYCT, UPRR, and Vossloh Projects Awarded

2015 Spring – New FRA BAA 2014-2 Project Awarded

2015 Summer – Hired Graduate Research Assistants Zhengboyang Gao and Aaron Cook, New RAIL.ONE, NDT Corp., and Federal Transit Administration (FTA) Projects Awarded

2015 Fall– Hired Graduate Research Assistant Alejandro Alvarez Reyes

Infrastructure Program Students/Staff

#	Last Name	First Name	MS/PhD	2007		2008		2009		2010		2011		2012		2013		2014		2015		2016		2017	
				Fall	Spring	Fall	Spring	Fall	Spring	Fall	Spring	Fall	Spring	Fall	Spring	Fall	Spring	Fall	Spring	Fall	Spring	Fall	Spring	Fall	Spring
1	Sawadisavi	Steven	MS																						
2	Zeman	John	MS																						
3	Schlake	Bryan	MS																						
4	Rickett	Tristan	MS																						
5	Gutierrez	Mauricio	MS																						
6	Molina	Luis Fernando	MS																						
7	Kernes	Ryan	MS/Staff																						
	Dersch	Marcus	Staff																						
8	Shurpali	Amogh	MS																						
9	Rapp	Chris	MS																						
	Grasse	Justin	MS																						
	Wei	Sihang	PhD																						
	Chen	George	PhD																						
10	Van Dyk	Brandon	MS																						
	Shin	Moochul	PostDoc																						
11	Bizarria	Thiago	MS																						
12	Williams	Brent	MS																						
	Manda	Kartik	MS																						
13	Scheppe	Andrew	MS																						
	Zhang	Austin	MS																						
14	Greve	Matthew	MS																						
15	Csenge	Matthew	MS																						
16	Wolf	Henry	MS																						
17	Holder	Donovan	MS																						
18	Munyaneza	Bosco	MS																						
19	Kaijun	Zhu	MS																						
20	Bastos	Josue	MS																						
	Qian	Yu	Staff																						
21	Lin	Xiao	MS																						
22	Ghosh	Arkaprabha	MS																						
23	Cook	Aaron	MS																						
24	Zhengboyang	Gao	MS																						
25	Alvarez	Alejandro	MS																						
26	Lima	Arthur	MS																						

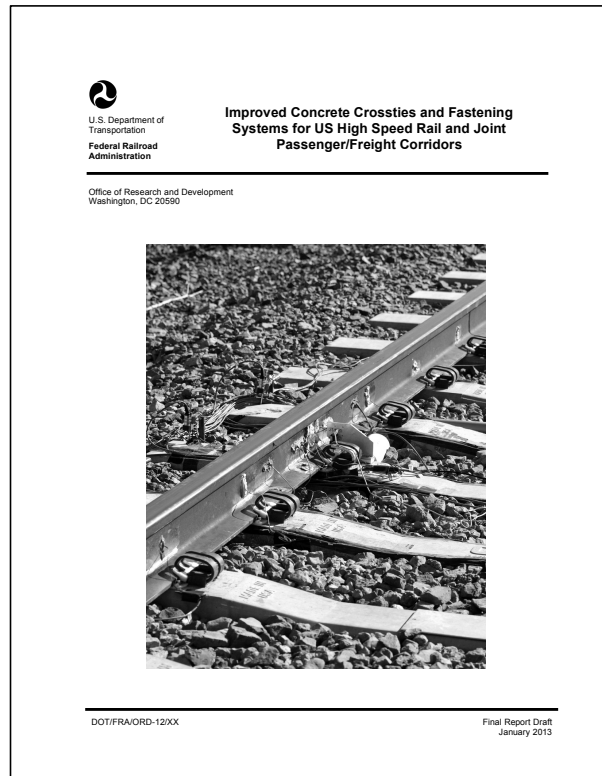
Students → The ultimate final deliverable
 Progression of students into industry → Very impactful to our program

Papers, Posters, and Presentations

Year	Conference / Meeting	Papers	Presentations	Posters
2009	AREMA	1	1	
	IHHA	1	1	0
2010	TRB	1	1	0
	AAR Research Review			1
	JRC	1	2	0
	AREMA	2	2	
2011	TRB	1	0	1
	IHHA	3	0	2
	AAR Research Review			1
	JRC	0	2	0
	WCRR	2	0	2
2012	AREMA	1	1	
	TRB	1	1	1
	AAR Research Review			1
	JRC	2	6	0
	WRI		1	
	PCI	1	1	0
	AREMA	1	1	
ACerS Concrete Conference	0	0	1	
2013	TRB	2	2	0
	IHHA	6	6	1
	AAR Research Review			4
	JRC	3	8	0
	WRI		1	
	AREMA	1	1	
	WCRR	4	1	3
2014	TRB	4	3	1
	AAR Research Review			1
	JRC	4	8	
	AREMA	1	1	
2015	TRB	4	1	3
	JRC	2	6	
	AAR Research Review			1
	APTA	1	1	
	IHHA	5	4	1
2016	AREMA	2		
	TRB	5	4	1
	JRC	3	6	
Total		65	73	26

FRA Final Report – Update

- Finalized and posted on internal portion of RailTEC website
- **USE IT!**
- **SHARE IT with Industry Partners!** (or others with permission)
- FRA is working to publish it and technical editors are reviewing it presently (thanks Cam)



Website: http://railtec.illinois.edu/CEE/Crossties/FRA_Final_Report.php

Final Report - Table of Contents

Executive Summary

Volume 1

1. Introduction and Background
2. Mechanistic Design of Concrete Crossties and Fastening Systems
3. Results and Conclusions
4. References
5. Abbreviations and Acronyms

Volume 2

1. International Survey Results
2. Loading Quantification Document
3. Laboratory Instrumentation Plan
4. Laboratory Instrumentation Results
5. Field Instrumentation Plan
6. Field Instrumentation Results
7. Modeling Methodology and Development
8. Modeling Results (Parametric Analyses) and Conclusions
9. Analytical Model (I-TRACK) Development and Capabilities
10. References
11. Abbreviations and Acronyms

2014-2015 Accomplishments – Personnel

- Improved teamwork (noted both internally and externally)
- Continued strength in building relationships with industry
 - Good examples in CO at JRC and AAR conferences
- New hires:
 - Two New MS Students (Gao, Aaron, and Alejandro)
 - Many new hourly assistants
 - Research Engineer Yu Qian
 - Experimentation Manager Matthew Csenge

RailTEC's RAIL Grand Opening



RailTEC's RAIL Grand Opening



19 August 2015

Joseph Leader (NYCT Senior VP) with Matthew Csenge, Yu Qian, and
Melanie Loots (Asst. Vice Chancellor for Research at UIUC)

RailTEC's RAIL Grand Opening



19 August 2015

Joseph Leader (NYCT Senior VP) with Jose Mediavilla
(RPS Director of Engineering – Fastenings)

2014-2015 Accomplishments - Projects

- First RailTEC Transit Research Project (NYCT)
- First major RailTEC Class I rail infrastructure research project (UPRR)
- International sponsors (Vossloh and RAIL.ONE)
- Additional field experimental programs: Vossloh, Class I Freight Railroad, and FTA Projects
- Large BAA under the “new FRA budget”
- Long awaited award of FTA Project!
- Continue to position ourselves for future projects

These projects are important because they relate to our ability to educate and employ (place) students.

2016 International Crosstie & Fastening System Symposium

- Co-organized by: **RailTEC, AREMA Committee 30 (Ties), Railway Tie Association (RTA)**
- *Three day conference with presentations, discussions, and a technical tour*
- **Focus → state of the art in crosstie and fastening system design, performance, research, modeling, and inspection**
- **14-16 June 2014** – Sessions on UIUC campus in Champaign, IL
15 June 2014 – Technical tour to UIUC's Research and Innovation Laboratory (RAIL)
- Strong domestic and international participation; addressing topics including:
 - *Laboratory and Field Testing*
 - *Component and System Modeling*
 - *Automated Inspection Technologies*
 - *Many more...*

SAVE THE DATE

2016 International Crosstie and Fastening System Symposium

Rail Transportation and Engineering Center (RailTEC)
University of Illinois at Urbana-Champaign

14 – 16 June 2016

Call for Spoken Presentation Abstracts Coming Late Fall 2015



Technical and Research Topics for Abstract Consideration

State of Practice	Loading Environment
Laboratory and Field Testing	Tie Preservation
Component and System Modeling	Field Performance
Design Methodologies and Advances	Failure Modes
Manufacturing Innovations	Research Needs
Automated Inspection Technologies	

Technical Tour Information

UIUC - Visit RailTEC's Newly Expanded Research and Innovation Laboratory (RAIL)

Dinner at Allerton Park

Special Keynote Address to be announced.

For more information please contact:
crosstie-conf@illinois.edu

In Partnership with



Acknowledgements – Research Sponsors



U.S. Department of Transportation
Federal Railroad Administration



U.S. Department of Transportation
Federal Transit Administration



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Acknowledgements – Industry Partners

FRA Tie and Fastener BAA:



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RAIL PRODUCT SOLUTIONS™



FTA Tie and Fastener Research Project:



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