



Part II - UTC Specific Indicators

UTC Name: National University Rail (NURail) Center
Grant #: DTRT12-G-UTC18
Reporting Period: January 1 - December 31, 2014

Performance Indicators		Consortium Total
Research Capability		
1	Number of papers on NURail sponsored research published in peer-reviewed journals or industry publications:	37
2	Number of publications in academic and industry conference proceedings	71
3	Number of presentations at academic and industry conferences and workshops	126
4	Number of NURail sponsored theses or dissertations at the MS and PhD levels.	
a	<i>Number of MS theses</i>	9
b	<i>Number of PhD dissertations</i>	1
5	Number of NURail final reports issued during the grant year	9
6	Number of citations of each of the above	1
7	Number of research tools (lab equipment, models, software, test processes, etc.)	10
Leadership		
1	Number of rail-related professional and service organization committees that NURail faculty researchers participate in or lead.	
a	<i>Number participated in</i>	44
b	<i>Number led</i>	6
2	Number of research and educational colloquia and workshops organized	13
3	Number of rail sessions developed and led at major transportation and rail industry conferences	9
4	Number of faculty researchers in leadership positions in:	
a	<i>Professional societies</i>	9
b	<i>Advisory committees</i>	7
c	<i>Conference Organizing Committees</i>	22
5	Number of relevant awards received during the grant year	3
6	Number of NURail professionals participating in short-term and long-range transportation planning	5
7	Number of other activities promoting rail academic research and education	38
Education & Workforce Development		
1	Number of rail courses offered (not necessarily NURail stimulated).	
a	<i>On-Campus</i>	17
b	<i>Distance</i>	7

Performance Indicators		Consortium Total
2	Number of rail related classes developed or modified as a result of NURail funding.	
<i>a</i>	<i>On-Campus</i>	10
<i>b</i>	<i>Distance</i>	2
3	Number of students participating in course offerings (both on-campus and on-line).	
<i>a</i>	<i>On-Campus</i>	453
<i>b</i>	<i>Distance</i>	26
4	Number of internships and full time positions secured in the industry and	
<i>a</i>	<i>Number of internships</i>	
	Internships w/Class 1 railroads	7
	Internships w/railroads, but not Class 1	1
	Internships with consulting firms	8
	Internships with other: AeroMexico	1
<i>b</i>	<i>Number of full time positions</i>	
	Full time w/Class 1 railroads	14
	Full time w/railroads, but not Class 1 - Central Japan Railway Company	2
	Full time with consulting firms	11
	Full time with the government	1
	Full time with other:	4
5	Number of NURail sponsored students participating in academic or industry conferences, workshops, or symposia.	
	TRB	41
	JRC	41
	NURail Annual Meeting	31
	AREMA	78
	INFORMS	11
	Summerail	3
	APTA	5
	RREC	20
	GLXS	20
	Tie Symposium	12
	SNCF Workshop	10
	Michigan Rail Conference	5
	Logistics, Trade and Transportation Symp	2
6	Number of K-12 outreach activities and student participants the grant has helped to support	
	Kentucky E-Day	50
	CMAA Cooperative High School Program	20
	Rail & Intermodal Summer Youth Program	24
	Engineering Open House	12000
	Boy Scout NOVaree	250
	Hanson Springfield Minority Visit	35
7	Number of initiatives / activities related to training / workforce development (live and online).	11 activities
	Lecture by Parsons Brinckerhoff manager - UIC-COE	1
	METRA Management Training - Rose-Hulman	5
	Michigan Rail Conference - Michigan Tech	5

Performance Indicators		Consortium Total
	Rail Day/Expo - Michigan Tech	300+
Tech Transfer		
1	Technology transfer focused activities (articles, seminars, posters, workshops, etc.)	75
2	Professional development participation (meetings, briefings, committees)	2
3	New Technologies / Innovation (applications, concepts, technologies, etc. adopted by the rail industry, licenses, cooperative research agreements or creation of new business entities)	3
	UIC - CUPPA Roundtable hosted for Ning Ai's Environmental GIS project that included stakeholders providing valuable feedback and learning about applications of the tool.	
	Michigan Tech: Alloy Design and Testing of Austempered Ductile Iron for Rail Wheels Project; High temperature magnetic permeability sensor. The instrument is meant to monitor magnetic permeability as an indicator of microstructural changes within a sample while inside a furnace at temperatures up to 450C. It consists of two pairs of concentric coils of wire, with each pair connected to a voltage integrator circuit, from which the magnetic hysteresis loop can be measured using a DAQ unit.	
	Michigan Tech: A MATLAB routine to process DSC curves to extract peak onsets for activation energy determination. The user provides a set of raw data files from the DSC, and the routine plots each curve, prompts for a set of fitting limits, fits a parabola to the baseline curve, and fits a Pearson VII distribution to the transformation peak. The intersection of the two fitted curves (and the associated fitting errors) for each scan is output to a collected data file, which can then be plotted to determine kinetic parameters for the transformation in that sample material.	
Collaboration		
1	Number of joint research proposals	
	<i>Funding opportunity name</i>	9
	UKY: no new proposals, but did work with UIUC, UIC and UTK under current grant	UIUC, UIC, UTK
	Michigan Tech: Ohio DOT: Development and Evaluation of Railroad-Highway Grade Crossing Traffic Control Devices	P. Lautala, T. Havens, D. Nelson
	Michigan Tech: University of Wis-Madison: Evaluating the Use of Operational Management Techniques for Capacity Improvements on Shared-Use Rail Corridors	P. Lautala, H. Pourousef
	Michigan Tech: MDOT: National University Rail Transportation Center (NURail) Tier I	P. Lautala
	Michigan Tech: FRA SBIR submittal with GLSV	P. Lautala, D. Nelson
	Michigan Tech: FRA SBIR submittal with J. Blough & G. Parker	P. Lautala, D. Nelson
	UTK: Locomotive Simulator Development to Support Railroad and Crossing Safety Study	Jin, M. and D. Clarke
	UTK: Development and Evaluation of DSRC at Rail Crossings	Gao, W., M. Jin, L. Han, and D. Clarke
	MIT: one proposal, no additional information given	
2	Number of joint papers	
	<i>Paper title</i>	4

Performance Indicators		Consortium Total
	Wang, T., R.R. Souleyrette, D. Lau, A. Aboubakr and E Randerson. "Quantifying Rail Highway Grade Crossing Roughness: Accelerations and Dynamic Modeling." Proceedings of the 92nd Annual Meeting of TRB, Washington, DC, Jan. 2015. 11 pages.	
	Wang, T*, R. Souleyrette, A. Aboubakr* and E. Randerson, "Quantifying Grade Crossing Condition as an Input to Modeling Safety," Proceedings of the 2014 Global Level Crossing Safety & Trespass Prevention Symposium, Urbana, IL, August 3 - 8, 2014. (W)	
	Train Design and Routing Optimization for Evaluating Criticality of Freight Railroad Infrastructures	A.A. Khaled, M. Jin, D. Clarke, and M.A. Hoque
	Vehicle Fuel Consumption Minimization in Routing Over-Dimensioned and Overweight Trucks in Capacitated Transportation Networks	X. Zhu, A. Garcia-Diaz, M. Jin, and Y. Zhang
3	Number of joint presentations	
	<i>Presentation name</i>	7
	Sequencing and Scheduling in Railway Classification Yards	H. Li, M. Jin, and S. He
	Dynamic Railcar Connection Plan in a Classification Yar	H. Li, R. Song, M. Jin, and S. He
	Classification Track Assignment in Railway Hump Yards	H. Li and M. Jin
	Wang, T, R. Souleyrette, A. Aboubakr and E. Randerson, "Quantifying Grade Crossing Condition as an Input to Modeling Safety," presentation at the 2014 Global Level Crossing Safety & Trespass Prevention Symposium, Urbana, IL, August 3 - 8, 2014.	Wang, T, R. Souleyrette, A. Aboubakr and E. Randerson
	McHenry, M., M. Brown, J. LoPresti, J. Rose, and R. Souleyrette, "The Use of Matrix Based Tactile Surface Sensors to Assess the Fine Scale Ballast-Tie 1 Interface Pressure Distribution in Railroad Track," presentation at 92nd Annual Meeting of the TRB.	McHenry, M., M. Brown, J. LoPresti, J. Rose, and R. Souleyrette
	UKY: Dr. Jerry Rose - Hay Seminar presentation	UIUC
	Sequencing and Scheduling in Railway Classification Yards	H. Li, M. Jin, and S. He
	Dynamic Railcar Connection Plan in a Classification Yard	H. Li, R. Song, M. Jin, and S. He
	Classification Track Assignment in Railway Hump Yards	H. Li and M. Jin
4	Number of jointly developed or taught courses	
	<i>List the course name(s).</i>	1
	Dr. Rose - REES	
5	Number of jointly organized seminars, workshops, or conferences	
	<i>Seminar, workshop or conference name(s).</i>	3
	UKY: Spotlight Conference w/8 members of the conference organizing team	
	REES	P. Lautala, D. Nelson, W. Sproule
	TRB Capacity Workshop	UIUC, UIC, MTU, UTK
Collaboration With Outside Organizations		
1	Number of organizations collaborated with during the grant year	38
2	Number of joint research proposals	9

Performance Indicators		Consortium Total
3	Number of joint papers	5
4	Number of joint presentations	8
5	Number of jointly developed or taught courses	2
6	Number of jointly organized seminars, workshops, or conferences	9