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# Evolution of Data Creation, Management, Publication, and Curation in the Research Process

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# EVOLUTION OF DATA CREATION, MANAGEMENT, PUBLICATION, AND CURATION IN THE RESEARCH PROCESS

## PAPER 14-0664: A CASE STUDY FROM PURDUE


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#TRBAM
**Monday, January 13, 2014**


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# PUBLICATIONS AND DATA
# CHANGES IN PUBLIC POLICY

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# CHANGES IN PUBLIC POLICY

**National Institutes of Health (NIH) – 2003**

"*The NIH expects and supports the timely release and sharing of final research data from NIH-supported studies for use by other researchers."*

**National Institutes of Health (NIH) – 2008**

"*It requires scientists to submit final peer-reviewed journal manuscripts that arise from NIH funds to the digital archive PubMed Central upon acceptance for publication.*"

**National Science Foundation (NSF) – 2011**

"*Plans for data management and sharing of the products of research. Proposals must include a supplementary document of no more than two pages labeled 'Data Management Plan'. This supplement should describe how the proposal will conform to NSF policy on the dissemination and sharing of research results.*"

**White House Office of Science and Technology Policy (OSTP) – 2013**

"*The Office of Science and Technology Policy (OSTP) hereby directs each Federal agency with over $100 million in annual conduct of research and development expenditures to develop a plan to support increased public access to the results of research funded by the Federal Government. Further, each agency plan for* ***both scientific publications and digital scientific data****…*"

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# TRANSPORTATION RESEARCH

## POLICY CHANGES TO FOLLOW?

**State Planning and Research (SPR) Funds**

- **Approximately $190 Million/year**

**Federal Highway Administration (FWHA)**

- **Reduction of duplicative research activities**

**U.S. Department of Transportation**

- **Response to OSTP Memo**

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# PAST PRACTICES

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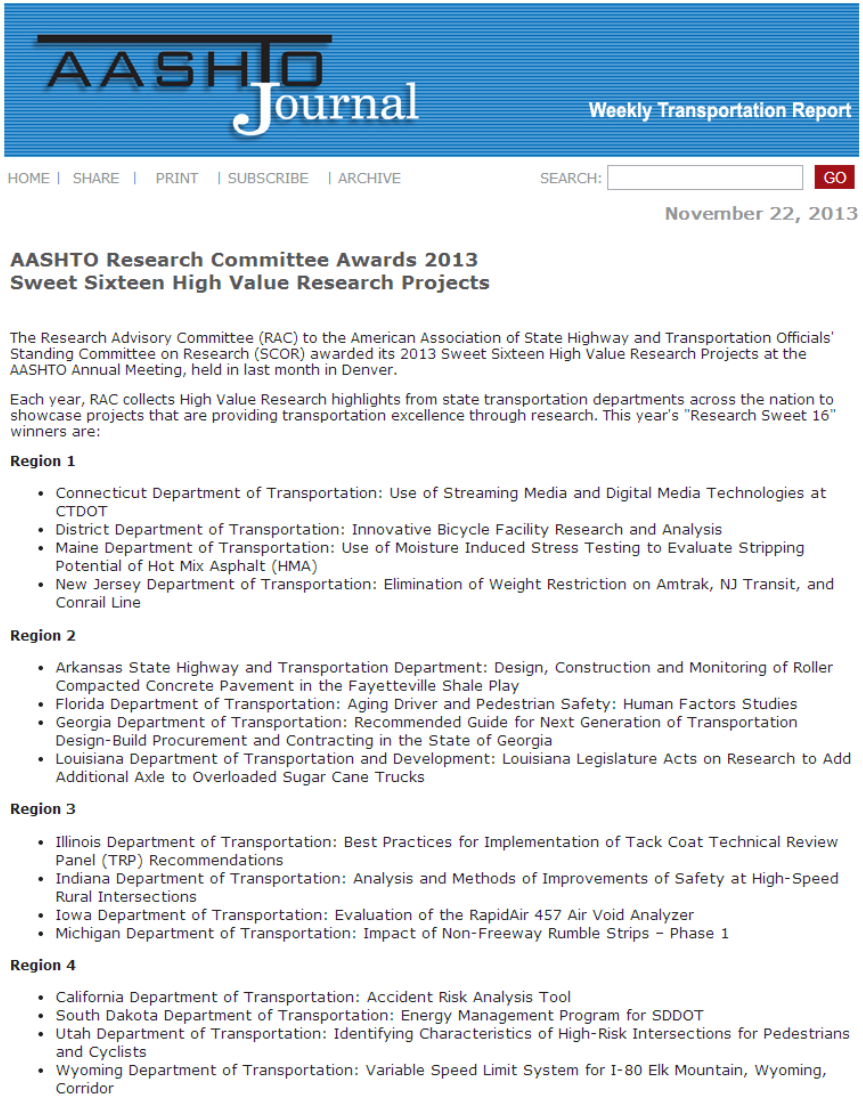
# PAST PRACTICES

## ACCESSIBILITY AND DISCOVERABILITY OPPORTUNITIES



AASHTO Journal

Weekly Transportation Report

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November 22, 2013

**AASHTO Research Committee Awards 2013 Sweet Sixteen High Value Research Projects**

The Research Advisory Committee (RAC) to the American Association of State Highway and Transportation Officials' Standing Committee on Research (SCOR) awarded its 2013 Sweet Sixteen High Value Research Projects at the AASHTO Annual Meeting, held in last month in Denver.

Each year, RAC collects High Value Research highlights from state transportation departments across the nation to showcase projects that are providing transportation excellence through research. This year's "Research Sweet 16" winners are:

**Region 1**

- Connecticut Department of Transportation: Use of Streaming Media and Digital Media Technologies at CTDOT
- District Department of Transportation: Innovative Bicycle Facility Research and Analysis
- Maine Department of Transportation: Use of Moisture Induced Stress Testing to Evaluate Stripping Potential of Hot Mix Asphalt (HMA)
- New Jersey Department of Transportation: Elimination of Weight Restriction on Amtrak, NJ Transit, and Conrail Line

**Region 2**

- Arkansas State Highway and Transportation Department: Design, Construction and Monitoring of Roller Compacted Concrete Pavement in the Fayetteville Shale Play
- Florida Department of Transportation: Aging Driver and Pedestrian Safety: Human Factors Studies
- Georgia Department of Transportation: Recommended Guide for Next Generation of Transportation Design-Build Procurement and Contracting in the State of Georgia
- Louisiana Department of Transportation and Development: Louisiana Legislature Acts on Research to Add Additional Axle to Overloaded Sugar Cane Trucks

**Region 3**

- Illinois Department of Transportation: Best Practices for Implementation of Tack Coat Technical Review Panel (TRP) Recommendations
- Indiana Department of Transportation: Analysis and Methods of Improvements of Safety at High-Speed Rural Intersections
- Iowa Department of Transportation: Evaluation of the RapidAir 457 Air Void Analyzer
- Michigan Department of Transportation: Impact of Non-Freeway Rumble Strips – Phase 1

**Region 4**

- California Department of Transportation: Accident Risk Analysis Tool
- South Dakota Department of Transportation: Energy Management Program for SDDOT
- Utah Department of Transportation: Identifying Characteristics of High-Risk Intersections for Pedestrians and Cyclists
- Wyoming Department of Transportation: Variable Speed Limit System for I-80 Elk Mountain, Wyoming, Corridor

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# CASE STUDY

## PURDUE LIBRARIES & THE JOINT TRANSPORTATION RESEARCH PROGRAM

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# INTRODUCING JTRP

## JOINT TRANSPORTATION RESEARCH PROGRAM


Established 1936 as a collaboration between INDOT and Purdue

Now a $5.3M annual investment in around 270 Purdue University students, faculty, and staff

Goal is to improve the efficiency of the Indiana transportation system and infrastructure

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# ALL HANDS MEETINGS

## PUL AND JTRP

Meetings (March-June 2013):

- Purdue University Libraries (PUL)
- JTRP-PUL Meeting

Shared goals:

- Compliance with funder requirements
- Expose data
- Create an integrated publishing workflow linking tech reports and data

Actions:

- Identify use case
- Stage datasets in PURR
- Format and stage tech report
- Linking the data

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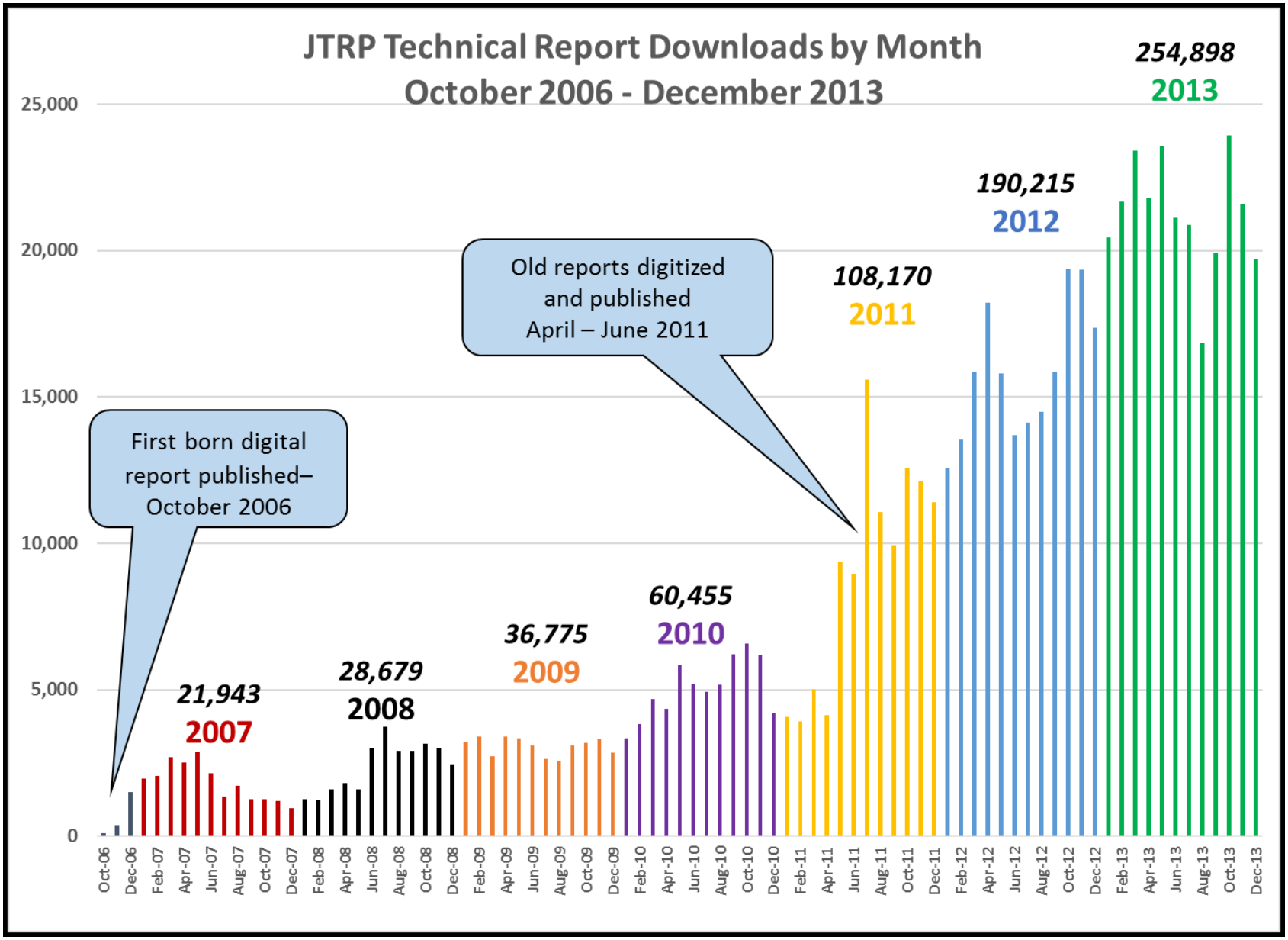
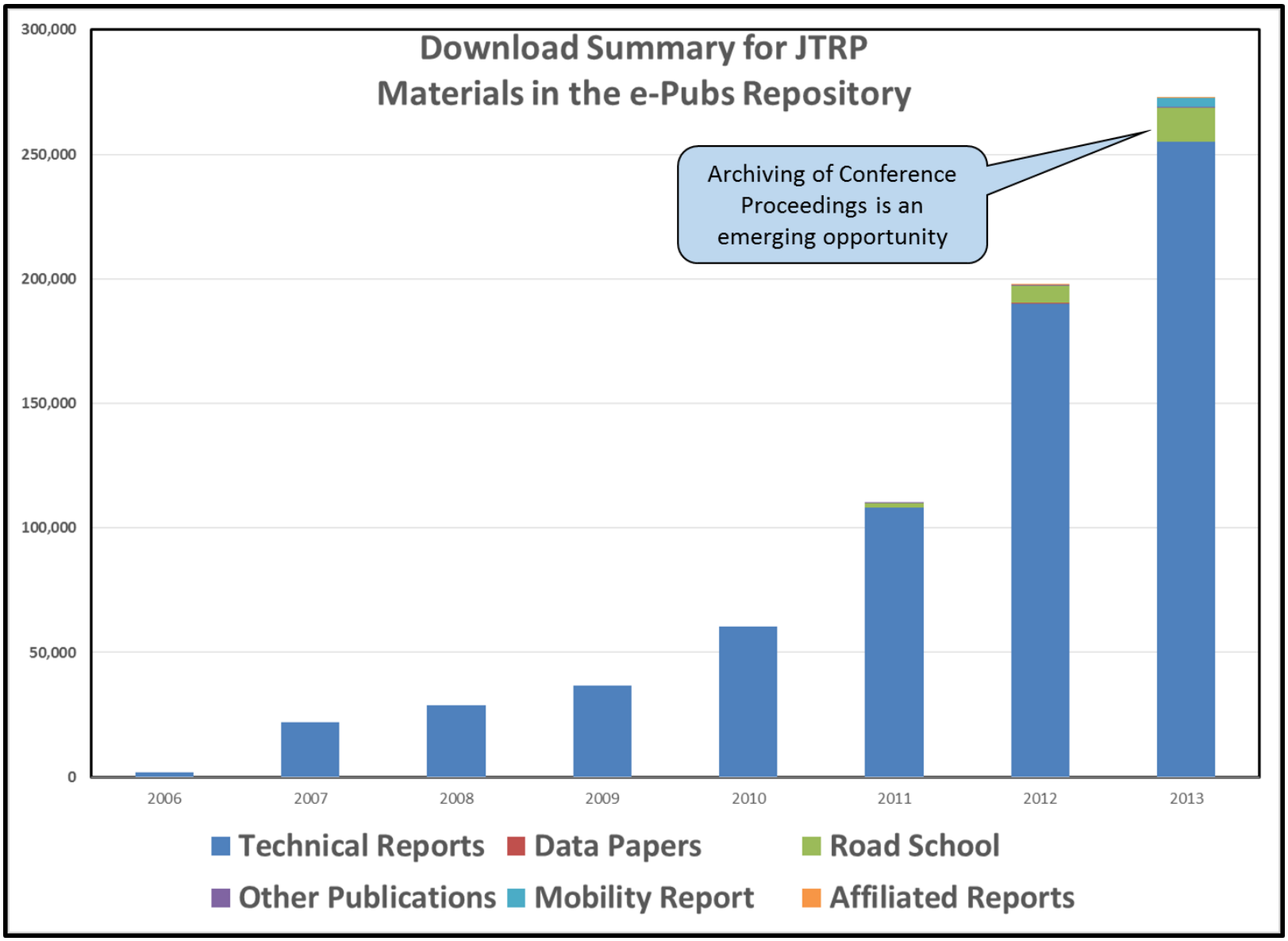
# PUBLICATION IMPACT



# PUBLICATION IMPACT



# EVOLVING WORKFLOWS

## PURDUE UNIVERSITY PRESS/PURDUE E-PUBS/JTRP

From…


To…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# REPOSITORIES

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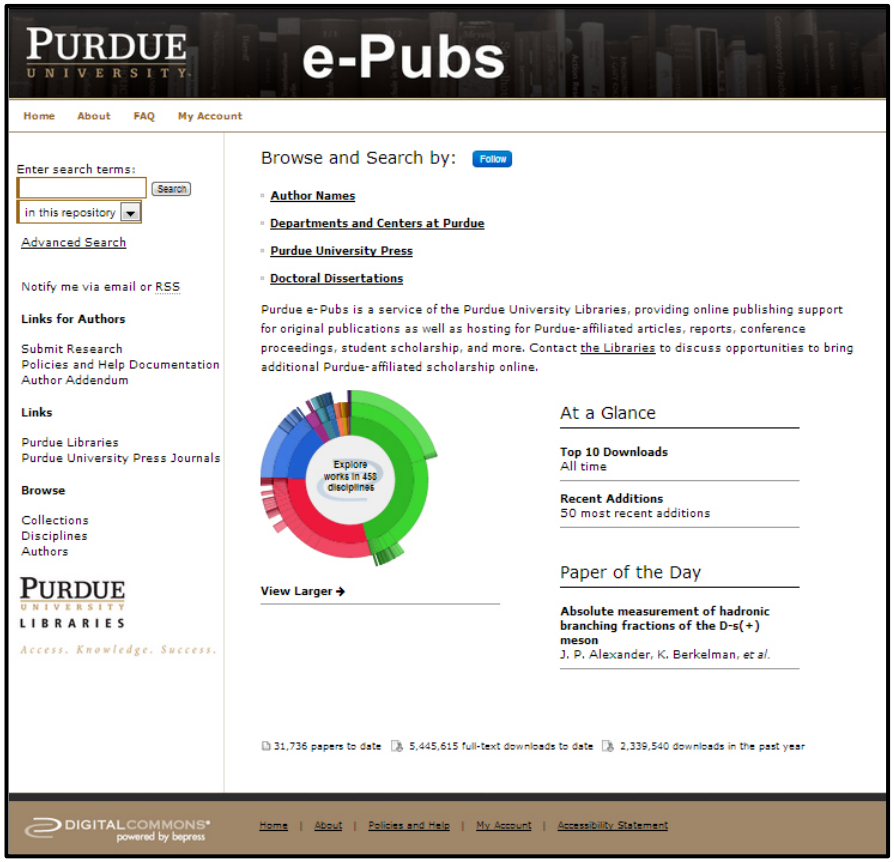
# A SERVICE MODEL OF COLLABORATION

## Purdue e-Pubs and the Purdue University Research Repository (PURR)

### Publications




### Data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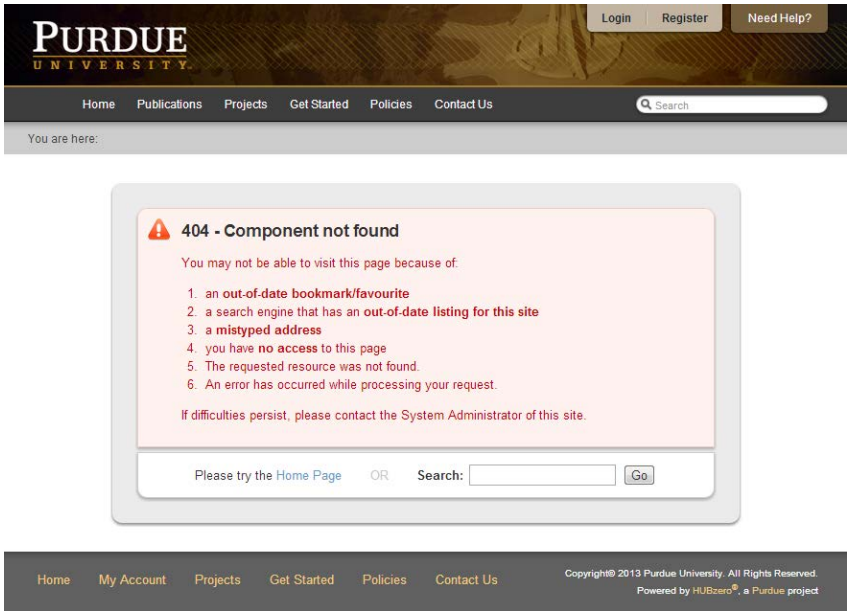
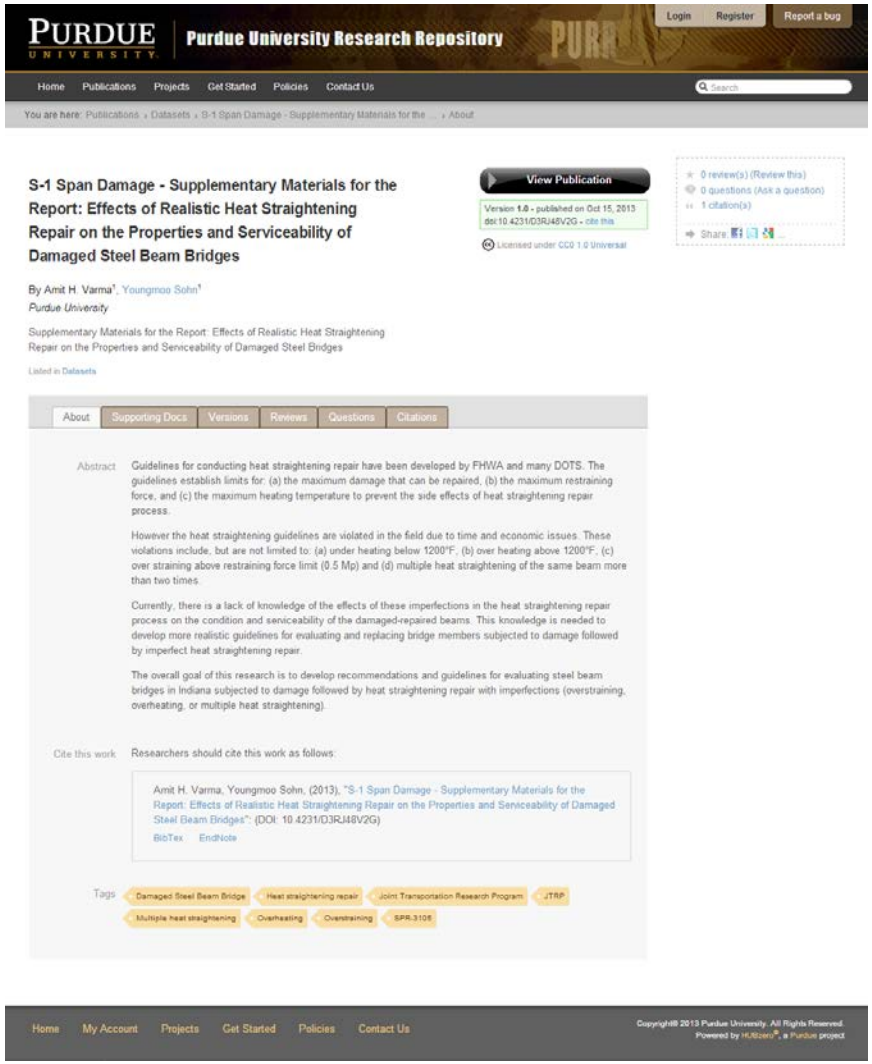
# EVOLVING WORKFLOWS

## PURDUE LIBRARIES/PURR/JTRP

### From…




### To…



# RESEARCH SUPPORT
# WORK FLOW MODELS

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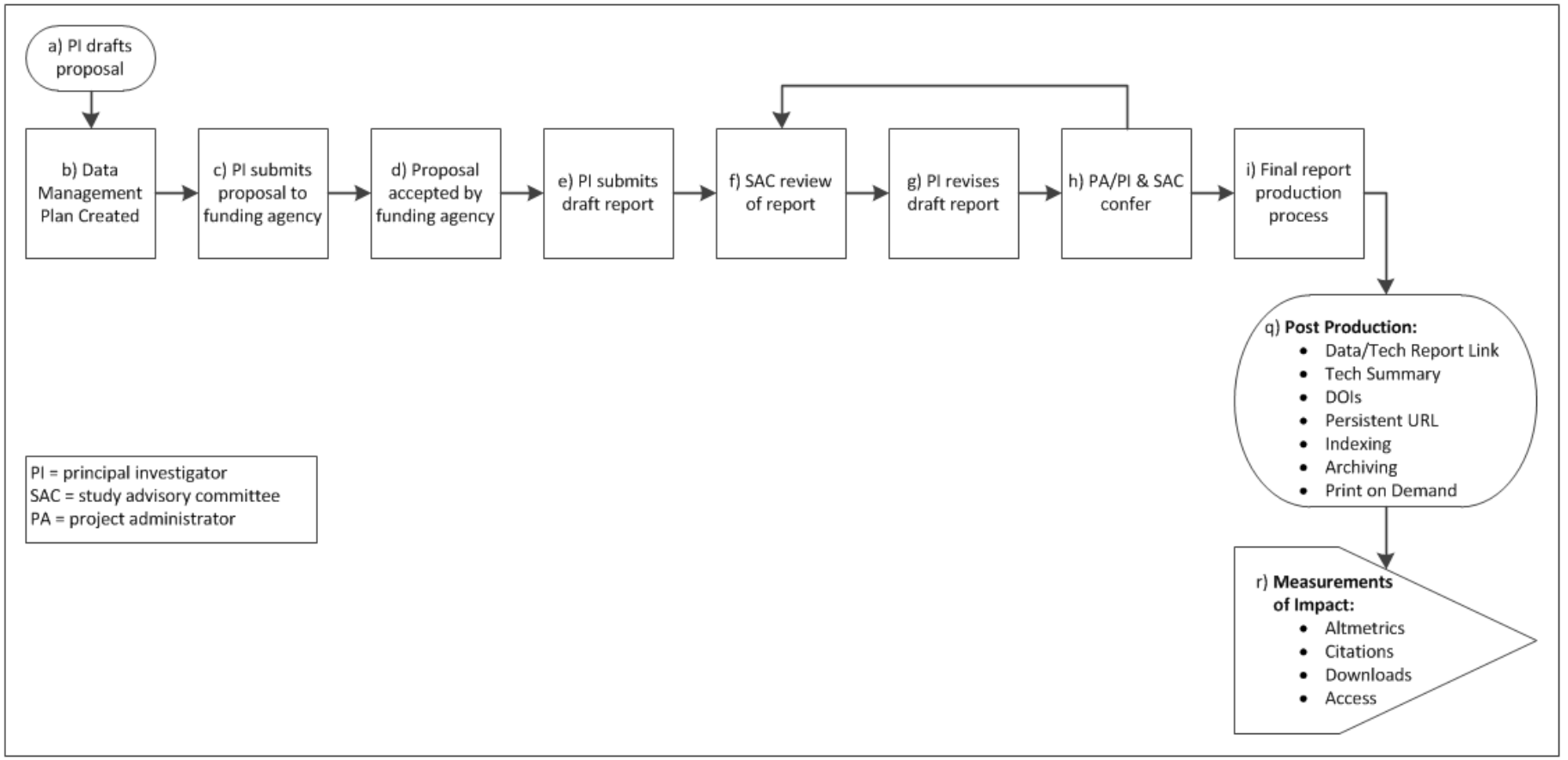
# TRADITIONAL SCHOLARLY PUBLICATIONS

## PURDUE UNIVERSITY PRESS/PURDUE E-PUBS/JTRP

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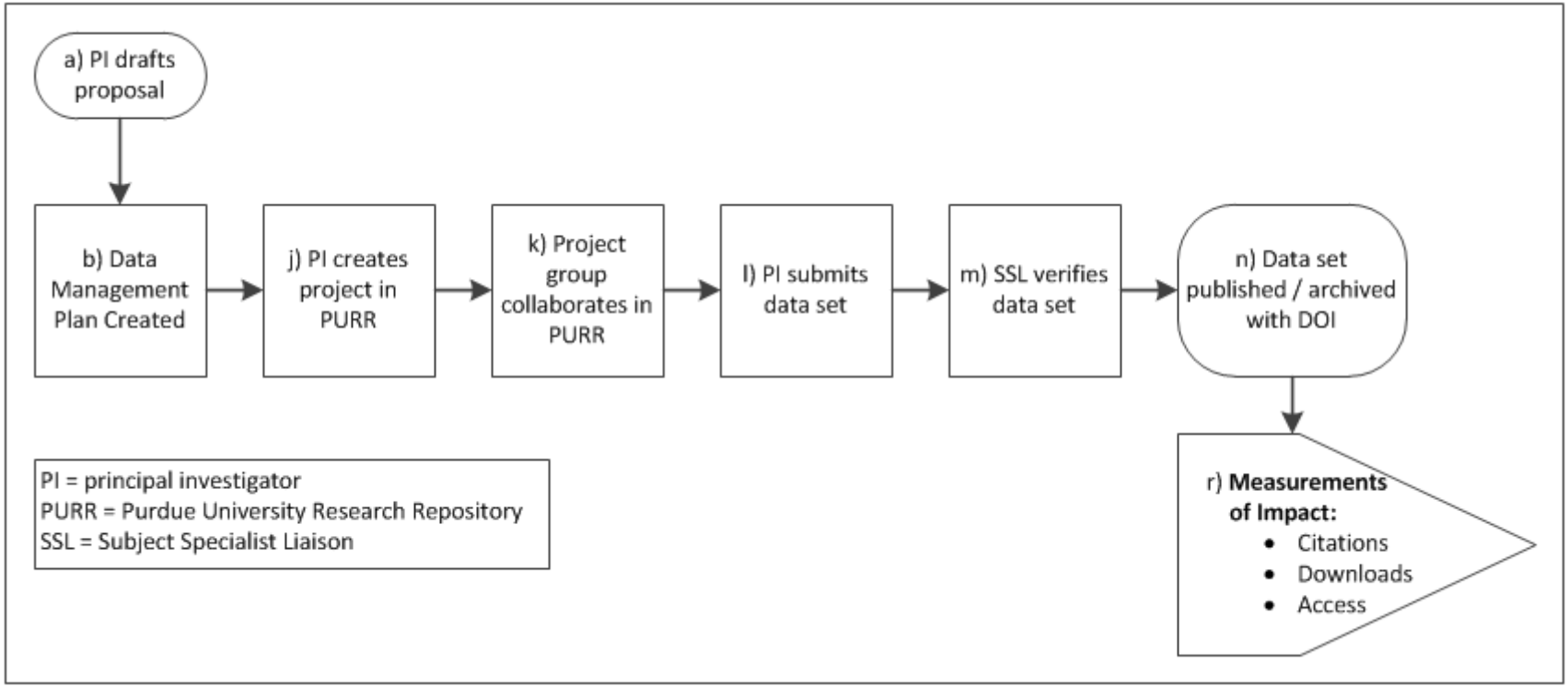
# PURR WORKFLOW

## DATA MANAGEMENT PLANNING , COLLABORATION, PUBLISHING, & PRESERVATION

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# LINKING TECHNICAL REPORTS AND DATA

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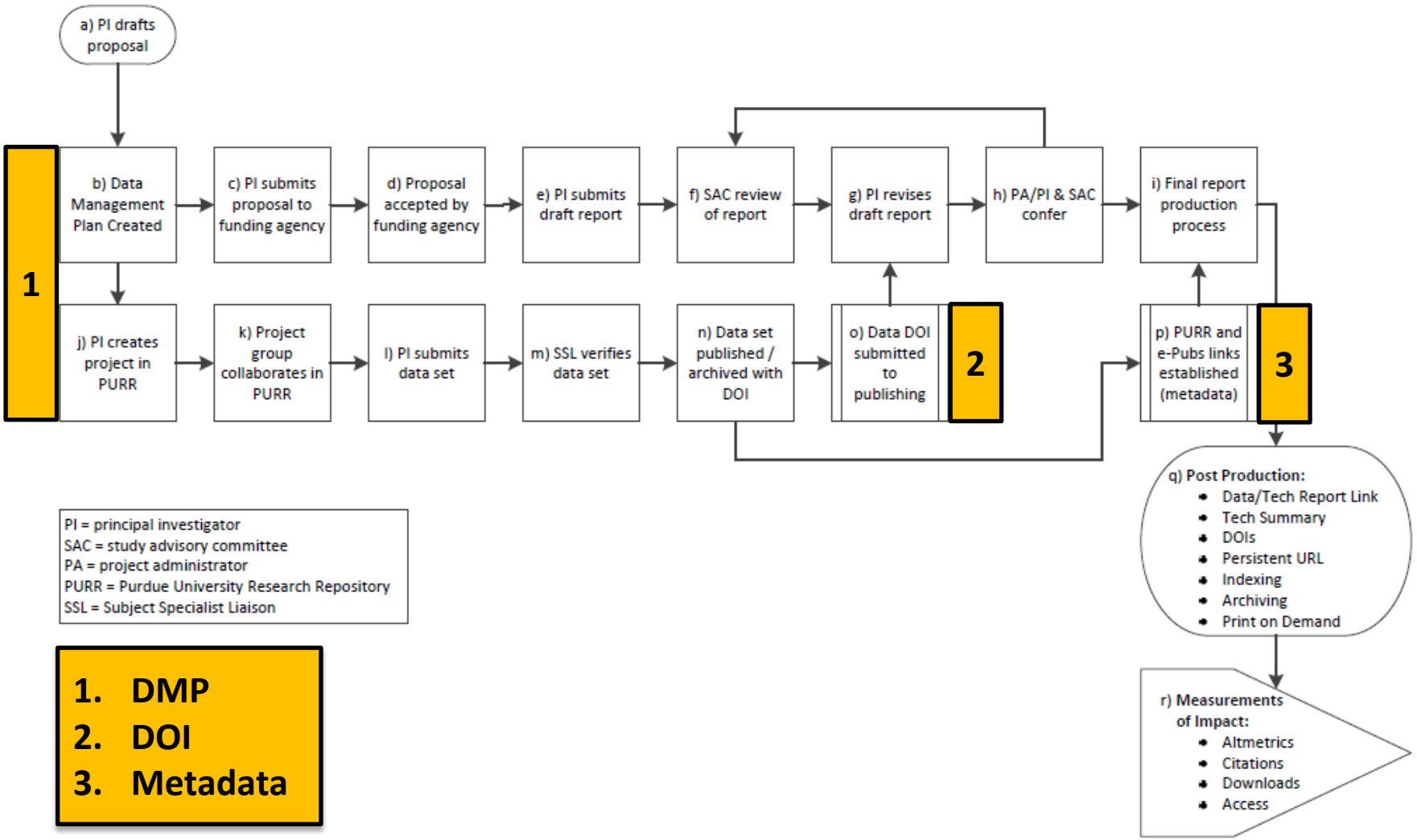
# COHESIVE PUBLICATION WORKFLOW




PI = principal investigator
SAC = study advisory committee
PA = project administrator
PURR = Purdue University Research Repository
SSL = Subject Specialist Liaison

1. **DMP**
2. **DOI**
3. **Metadata**

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# JTRP LINKED PUBLICATIONS

## TECHNICAL REPORT

- Varma, A. H. and Y. Sohn,
"Effects of Realistic Heat Straightening Repair on the Properties andServiceability of Damaged Steel Beam Bridges," Publication FHWA/IN/JTRP-2013/03, Joint Transportation Research Program, Indiana Department of Transportation and Purdue University, West Lafayette, Indiana, 2013. (DOI: 10.5703/1288284315184).

## DATA

- Amit Varma, Youngmoo Sohn, (2013), "ADJUSTING FORCE - Supplementary Materials for the Report: Effects of Realistic Heat Straightening Repair on the Properties and Serviceability of Damaged Steel Beam Bridges": (DOI:10.4231/D3SF2MC0W)
- Amit Varma, Youngmoo Sohn, (2013), "DAMAGED GIRDER - Supplementary Materials for the Report: Effects of Realistic Heat Straightening Repair on the Properties and Serviceability of Damaged Steel Beam Bridges": (DOI:10.4231/D3X63B541)
- Amit Varma, Youngmoo Sohn, (2013), "FORCE SYSTEM 1 - Supplementary Materials for the Report: Effects of Realistic Heat Straightening Repair on the Properties and Serviceability of Damaged Steel Beam Bridges": (DOI:10.4231/D3NS0KX8Z)
- Amit Varma, Youngmoo Sohn, (2013), "FORCE SYSTEM 2 - Supplementary Materials for the Report: Effects of Realistic Heat Straightening Repair on the Properties and Serviceability of Damaged Steel Beam Bridges": (DOI:10.4231/D3J09W45G)
- Amit Varma, Youngmoo Sohn, (2013), "FORCE SYSTEM 3 - Supplementary Materials for the Report: Effects of Realistic Heat Straightening Repair on the Properties and Serviceability of Damaged Steel Beam Bridges": (DOI:10.4231/D30Z70W9F)
- Amit Varma, Youngmoo Sohn, (2013), "N-1 Span Damage - Supplementary Materials for the Report: Effects of Realistic Heat Straightening Repair on the Properties and Serviceability of Damaged Steel Beam Bridges": (DOI:10.4231/D3W66984S)
- Amit Varma, Youngmoo Sohn, (2013), "N-2 Span Damage - Supplementary Materials for the Report: Effects of Realistic Heat Straightening Repair on the Properties and Serviceability of Damaged Steel Beam Bridges": (DOI:10.4231/D38G8FH7Z)
- Amit Varma, Youngmoo Sohn, (2013), "S-1 Span Damage - Supplementary Materials for the Report: Effects of Realistic Heat Straightening Repair on the Properties and Serviceability of Damaged Steel Beam Bridges": (DOI:10.4231/D3RJ48V2G)
- Amit Varma, Youngmoo Sohn, (2013), "S-2 Span Damage - Supplementary Materials for the Report: Effects of Realistic Heat Straightening Repair on the Properties and Serviceability of Damaged Steel Beam Bridges": (DOI:10.4231/D34Q7QQ3T)
- Amit Varma, Youngmoo Sohn, (2013), "TEMPERATURE - Supplementary Materials for the Report: Effects of Realistic Heat Straightening Repair on the Properties and Serviceability of Damaged Steel Beam Bridges": (DOI:10.4231/D3D795B1Q)

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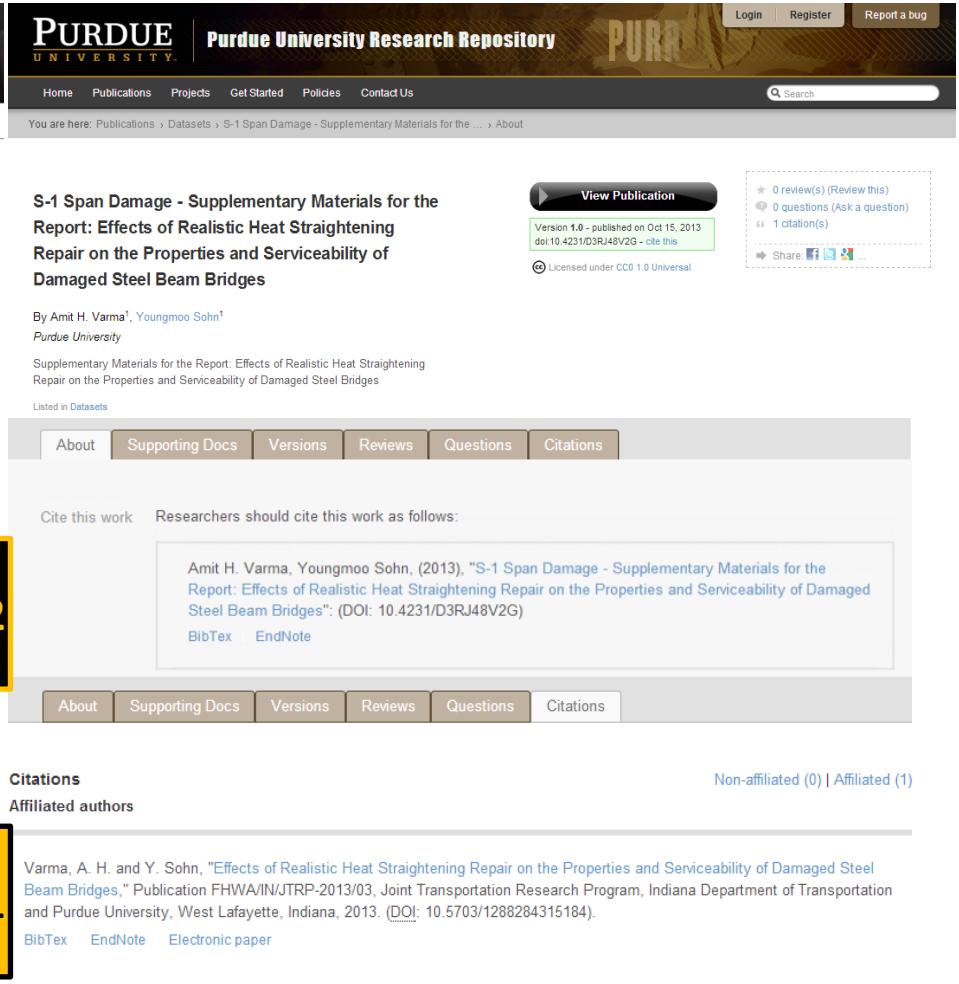
# LINKING DATA

## PURDUE E-PUBS AND PURR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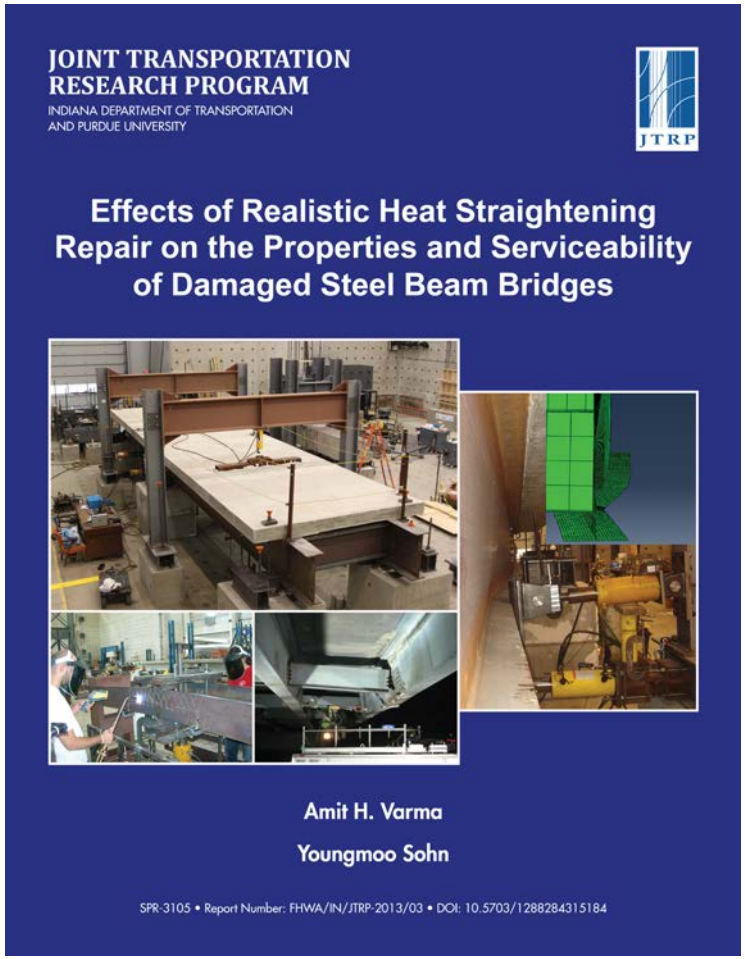
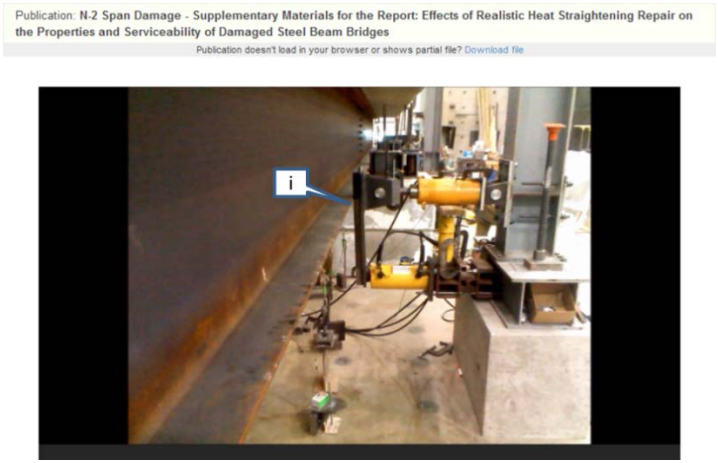
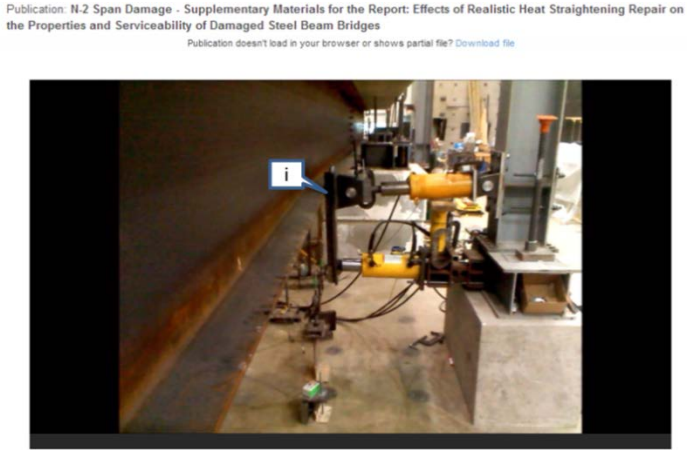
# LINKING DATA

## PURDUE E-PUBS AND PURR

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# MEASURING IMPACT

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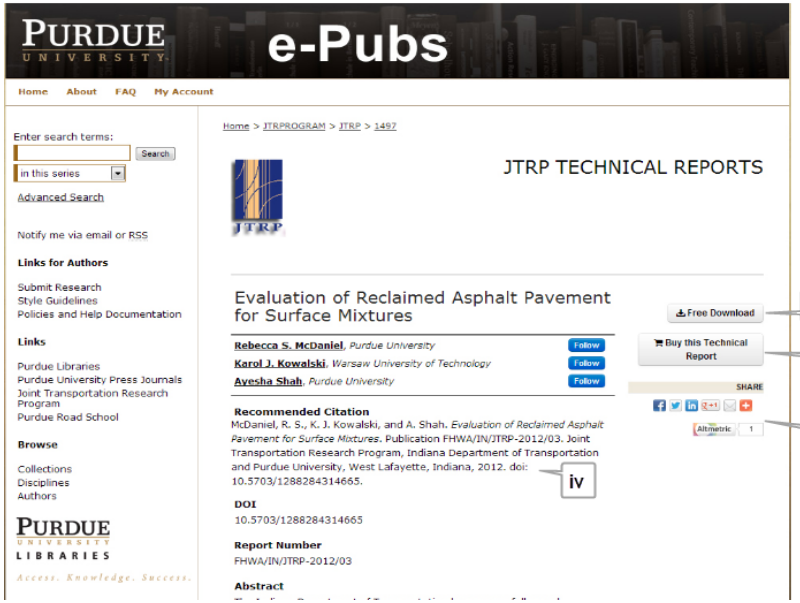
# MEASURING IMPACT





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# MOVING FORWARD
# BEST PRACTICES

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# MOVING FORWARD

## BEST PRACTICES


- Linked work flows
  - Coordinate resources
  - Anticipate needs
- Early interaction with the data repository
  - Employ good data management principles and practices
  - Ease citation management
  - Increase impact
- Traditional publication attributes
  - Increase visibility and discoverability
  - Meet funder requirements
  - Measure and assess impact
- Usage and access metrics
  - Monitor and evaluate through quantitative and qualitative measurements
  - Communicate impact

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# QUESTION AND COMMENTS

## Thank You

This work was supported in part by the Joint Transportation Research Program administered by the Indiana Department of Transportation and Purdue University. The contents of this paper reflect the views of the authors, who are responsible for the facts and the accuracy of the data presented herein, and do not necessarily reflect the official views or policies of the sponsoring organizations. These contents do not constitute a standard, specification, or regulation.

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# RESOURCES


- Executive Office of the President, Office of Science and Technology Policy. Memorandum – Increasing Access to the Results of Federally Funded Scientific Research. http://www.whitehouse.gov/sites/default/files/microsites/ostp/ostp_public_access_memo_2013.pdf
- Joint Transportation Research Program. https://engineering.purdue.edu/JTRP
- National Institutes of Health. Final NIH Statement on Sharing Research Data. http://grants.nih.gov/grants/guide/notice-files/NOT-OD-03-032.html
- National Institutes of Health. NIH Public Access Policy. http://grants.nih.gov/grants/guide/notice-files/NOT-OD-08-033.html
- National Science Foundation. Grant Proposal Guide. http://www.nsf.gov/pubs/policydocs/pappguide/nsf13001/gpg_2.jsp#dmp
- Newton, M.P., D.M. Bullock, C. Watkinson, P.J. Bracke, and D. Horton. “Engaging New Partners in Transportation Research: Integrating Publishing, Archiving, Indexing of Technical Literature into the Research Process,” Transportation Research Record: Journal of the Transportation Research Board, No. 2291, Transportation Research Board of the National Academies, Washington, D. C., pp. 111-123, 2012. doi: 10.3141/2291-13.
- Purdue e-Pubs. http://docs.lib.purdue.edu/
- Purdue University Research Repository (PURR). https://purr.purdue.edu/
- Zilinski, L, D., Scherer, D.A., Bullock, D.M, Horton, D.K. and Matthews, C.E., “Evolution of Data Creation, Management, Publication, and Curation in the Research Process,” Accepted, Transportation Research Board Annual Meeting, January 13, 2014, Paper No. 14-0664.


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