



# FY2021 RESEARCH AT-A-GLANCE

# LEADING THE WAY

**From its inception**, the Iowa Department of Transportation has been a leader in transportation research. Beginning with the Iowa Highway Research Board in 1949, Iowa DOT has stayed on the leading edge of innovations in materials, processes, and technologies that have brought improvement and longevity to transportation systems around the world.

**Our Mission:** Driving a quality research program that delivers targeted solutions for Iowa's transportation future.



## FOCUS AREAS | We organize our research efforts around four focus areas:



### SAFETY

Reducing transportation fatalities and serious injuries through system-wide, multimodal, data-driven, and proactive strategies.



### MOBILITY

Improving the accessibility, reliability, time, and costs associated with the movement of people and goods.



### SUSTAINABILITY

Considering how transportation supports economic, social, and environmental progress with a long-term perspective.



### TECHNOLOGY

Evaluating both current and potential technologies and incorporating them effectively into existing agency functions.

## SUPPORTING IOWA DOT'S RESEARCH PROGRAM

Iowa's transportation innovations are possible with oversight and technical and financial support from a variety of sources:

**IOWA HIGHWAY RESEARCH BOARD (IHRB)** This advisory group is responsible for assisting Iowa's cities and counties and Iowa DOT in the development and continuation of an effective program of research and progress in highway transportation. Funding for IHRB comes from Iowa's Road Use Tax Fund for research.

**STATE PLANNING & RESEARCH (SPR) PROGRAM** Funding from this Federal Highway Administration (FHWA) program supports statewide planning and research activities at state DOTs. SPR funds are also used for participation in the [Transportation Pooled Fund Program](#).

**STATE TRANSPORTATION INNOVATION COUNCIL (STIC)** Another FHWA-supported program, the STIC network offers technical assistance and funds to support the costs of standardizing innovative practices in state transportation agencies. STIC members come from federal, state, and local agencies; industry; and academia. IHRB serves as the STIC for Iowa DOT.

# ENGAGING & COLLABORATING WITH IOWA DOT RESEARCH

Iowa DOT Research strives to deliver top-quality, targeted solutions for Iowa's transportation future. Whether you're looking to get involved in our research, already have an approved project in the works, or simply want to learn more about our team, we can help.



GET INVOLVED

- **Submit an Idea.** Research ideas can be submitted by anyone (within or beyond the department) at any time through our [Research Ideas site](#).
- **Provide Input.** While ideas are in the open feedback stage, anyone can provide written comments or vote on new proposed ideas.



WORKING WITH US

- **Respond to a Proposal.** Requests for proposals (RFPs) are posted to the [Open Requests for Proposal web page](#) three times per year. Sign up to receive email notices of new RFP postings on our [News and Subscriptions page](#).
- **Discover Our Process.** Once a proposal is approved for funding, the work can begin! Learn more about the [steps the research team goes through](#), from contract to final report.



LEARN MORE

- **Follow the Money.** Our research projects are funded through [three primary programs](#). Find out more about them and how they each contribute to Iowa DOT's position as a national leader in innovative research.
- **Meet Our Partners.** Iowa DOT works with a variety of [institutions and external agencies](#) to achieve our goals.

## PROGRAM OUTREACH

Workshops and peer exchanges are an efficient and cost-effective way for transportation professionals to discuss their programs and best practices. Iowa DOT is frequently invited to participate as a model research program. Here are a few examples of our outreach in Fiscal Year 2021:

**AASHTO RAC Region 3 Peer Exchange, October 2020** – This two-day event hosted by Michigan DOT brought together 10 state DOTs to discuss transportation research goals, strategies, and processes.

**Innovation Fair and Peer Exchange, March 2021** – With a focus on bringing ideas to fruition, this single-day program hosted by Tennessee DOT showcased the programs and partnerships that have helped agencies achieve their transportation-related goals.

**Innovation and Knowledge Management Programs, March 2021** – Representatives from the U.S. Department of Transportation's John A. Volpe National Transportation Systems Center interviewed Iowa and six other states about their knowledge management programs. The information was compiled into an [informative report](#) on the common challenges and opportunities states face on the topic.

## University Collaboration

Through formal collaboration agreements with Iowa university partners, Iowa DOT is able to conduct state-of-the-art research and testing to discover new products and materials that will benefit all Iowans.



**Iowa State University**  
since 1997



**The University of Iowa**  
since 2003



**University of Northern Iowa**  
since 2007

Iowa DOT also partners with other universities and private sector firms on the state, national, and international levels.



# FOCUSING ON IOWA DOT RESEARCH

Research projects highlighted below and on the following page are a sampling of the nearly 200 research projects that are in process or recently completed grouped by the four focus areas.

## SAFETY

### Reducing Uncertainties in Snow Fence Design

Blowing and drifting snow can reduce visibility, creating hazardous conditions for drivers on Iowa's roadways. To combat this, Iowa DOT employs a variety of snow fences to catch snow drifts and keep roads clear. This effort measured the amount of snow that accumulates at specific sites to help design more efficient snow fences. [IHRB Project TR-760](#)



### Bank Stability Assessment Tool for Bridge Abutment Infrastructure in Iowa

Flowing water can erode a river's bank over time, threatening the stability of a bridge's foundations. This project developed a tool for analyzing bank erosion so that decision-makers can identify potential areas of concern and devise mitigation strategies to avoid future problems. [SPR Project RB10-014](#)

## MOBILITY

### Asset Management, Extreme Weather, and Proxy Indicators

As extreme flooding events in Iowa become more frequent, catastrophic and costly, decision-makers across the state need a way to anticipate the areas and infrastructure at greatest risk. This methodologies and risk indicators developed from this project will identify vulnerable locations as part of a larger statewide transportation asset management plan. [IHRB Project TR-741](#)



### US 52 Overflow Bridge over MS River

The US 52 overflow bridge that spans the Mississippi River is being replaced, and Iowa is using innovative materials and techniques to reduce construction time and traffic disruption. By studying and monitoring the bridge after it's completed, researchers will validate the design and methods for possible use in future bridge projects.

[SPR Project RB17-014](#)

# SUSTAINABILITY

## Development of Bio-Based Polymers for Use in Asphalt — Phase II

Increased public demand for sustainable and biodegradable pavements led researchers to develop a biopolymer that can be used in asphalt mixtures to achieve similar performance goals as traditional asphalt pavements. This material can also be used in other applications, promising future economic potential and job opportunities for the people of Iowa. [IHRB Project TR-720](#)



## Assessing and Enhancing Iowa's Transportation Resilience

In addition to causing significant financial damage, severe flooding can also devastate a community's connectivity and accessibility. By developing a framework that considers all of the potential direct and indirect impacts to an area, engineers can identify priorities and help communities recover more quickly. [SPR Project 17-SPR0-013](#)

# TECHNOLOGY

## Exploration of Ultrasound for the Evaluation and Preservation of Structures

This research investigated the use of ultrasound for evaluating the condition of a bridge's structure. While additional study is needed, the results indicate this technology has the potential to serve as a viable and non-invasive alternative to traditional evaluation methods. [IHRB Project TR-757](#)



## Advanced Non-Destructive Bridge Deck Condition Assessment

High-speed, high-definition sensing technology offers a faster and more efficient way to collect and analyze concrete bridge decks data than visual inspections. The technology can be used to predict when repairs will be needed so that mitigation strategies and budgets can be planned accordingly.

[SPR Project 20-SPR0-007](#)

**Get Involved!** Iowa DOT staff and partners from local public agencies and industry can be part of the research process by becoming a member of a research group or committee, [submitting an idea](#), or providing feedback on other ideas. Staff can also represent Iowa at the national level by serving on research and technical committees convened by the [Transportation Research Board](#) and [AASHTO](#).

# LEVERAGING FUNDING WITH PARTNERSHIPS

## Getting the Most From Our Research Dollars

By leveraging partnerships, efforts led by Iowa DOT get **46% more funding for the same investment.**

### Transportation Pooled Fund Program

By joining forces, two or more DOTs with a shared research goal can get all the benefits of the research results at a fraction of what it would cost individually. Iowa DOT is a nationally recognized leader in transportation research, participating in 61 active **Transportation Pooled Fund (TPF)** studies and serving as the lead agency for 22 of these. Project results help Iowa DOT make better-informed decisions, conserve resources, and remain on the cutting edge of technological advancements.

#### TPF-5(472): Innovations in Freight Data Workshop



For the third time, this **pooled fund workshop** brought freight data users and decision-makers together for a virtual information exchange in September 2021. With a variety of

interactive opportunities for learning, collaboration, and live demonstrations, the pooled fund built on lessons learned from the 2017 and 2019 workshops.

#### TPF-5(313): Technology Transfer Concrete Consortium (TTCC)



Innovative methods and materials can help concrete last longer, resulting in fewer repairs and less impact on the traveling public. Iowa DOT continues to serve as the lead state for this **pooled**

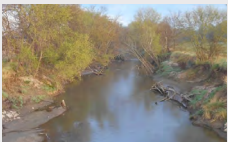
**fund project**, which focuses on identifying opportunities for research to develop more durable concrete formulas and methods that member states can use.

### Iowa Highway Research Board

As the first organization of its kind in the United States to investigate road construction problems at the local level, the work of the **Iowa Highway Research Board (IHRB)** over the past 70 years has contributed to Iowa's reputation as a leader in transportation solutions. The IHRB consists of 15 regular members and represents a variety of stakeholders. The group oversees approximately 20 research projects each year and has overseen nearly 800 projects since it was established.



#### HR-140: Collection and Analysis of Streamflow Data



Since 1968, IHRB has partnered with the U.S. Geological Survey to share the costs associated with collecting data and monitoring Iowa's water, which can help

forecast floods, improve water quality, and more. The results help water-resource managers in the state make more cost-effective and better-informed decisions.

#### HR-296: Iowa Local Technical Assistance Program (LTAP)



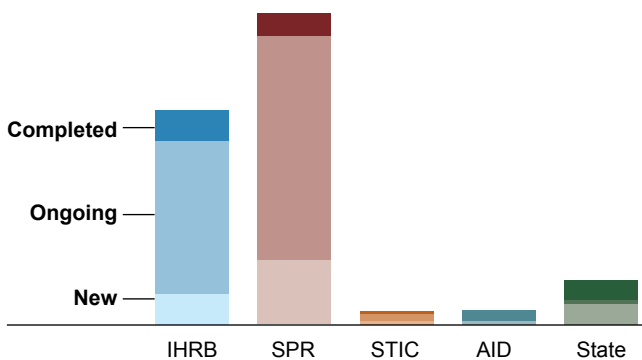
IHRB has sponsored the **Iowa LTAP program** since 1986. LTAP offers cooperative solutions to smaller governments by providing technical support and

management assistance through a range of programs and educational opportunities.

# IOWA DOT'S RESEARCH PROGRAM BY THE NUMBERS

## Research Program Activity

Iowa DOT Research staff oversaw 178 projects in FY2021.

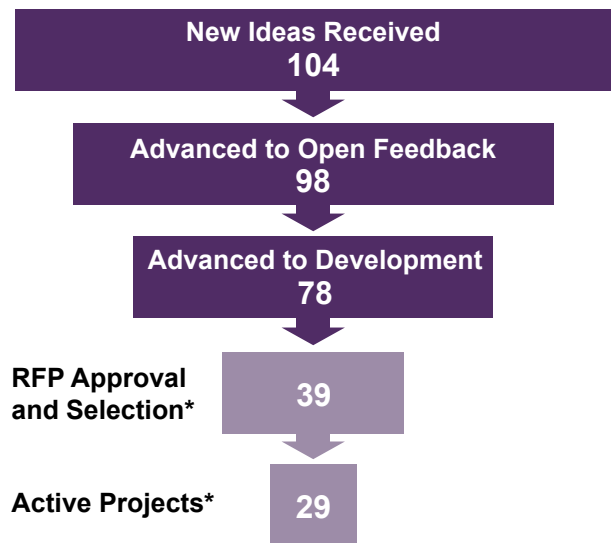


Project Type	IHRB	SPR	STIC	AID	State	Total
New	9	19	1	1	6	36
Ongoing	46	67	2	3	1	119
Completed	9	7	1	0	6	23

## Research Idea Submissions

Research ideas can be submitted by anyone at any time through the [Research Ideas site](#). While ideas are in the open feedback stage, anyone can provide written comments or vote on a new idea.

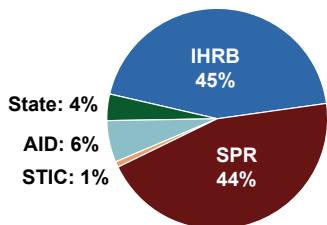
Almost all of the FY2021 research ideas progressed to the open feedback stage; more than three-fourths advanced to development.



\*Includes projects developed in previous fiscal years.

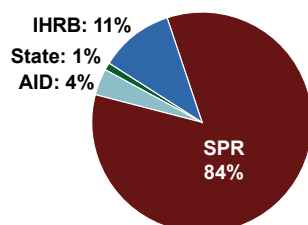
## FY2021 FUNDING BY PROGRAM:

### New FY2021 Funding



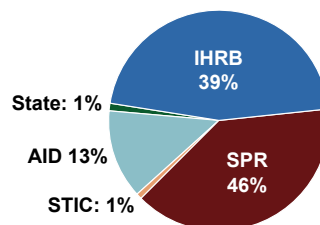
IHRB	\$3,090,906
SPR	\$3,032,100
STIC	\$100,000
AID	\$440,000
State	\$250,000
<b>Total</b>	<b>\$6,913,006</b>

### New Leveraged Funding for FY2021



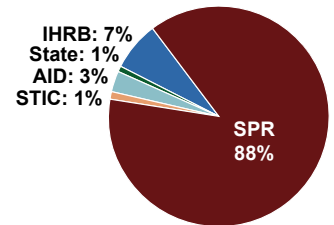
IHRB	\$355,476
SPR	\$2,676,500
STIC	\$0
AID	\$136,236
State	\$7,500
<b>Total</b>	<b>\$3,175,712</b>

### Total Iowa Funding for All Active Projects



IHRB	\$10,709,413
SPR	\$12,783,790
STIC	\$280,000
AID	\$3,498,200
State	\$244,477
<b>Total</b>	<b>\$27,515,880</b>

### Total Funding from All Sources for All Active Projects

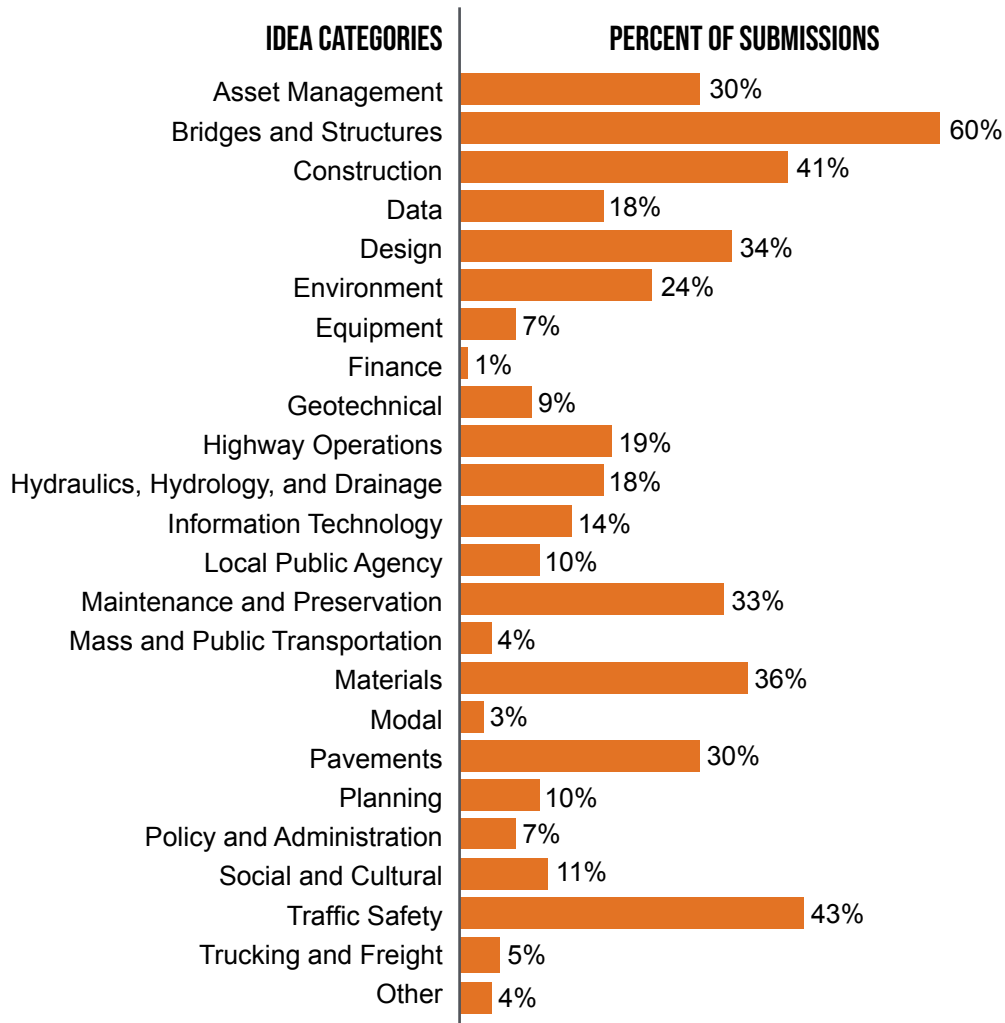


IHRB	\$12,997,807
SPR	\$153,340,334
STIC	\$380,000
AID	\$5,785,986
State	\$251,977
<b>Total</b>	<b>\$172,756,104</b>

# IOWA DOT'S RESEARCH PROGRAM BY THE NUMBERS

## Categorizing Research Ideas

The categories assigned to all research ideas submitted provide an early indication of what future projects will focus on. More than one category can be assigned to an idea.



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