Airport Concrete Pavement Technology Program

Section 744 of the 2018 FAA Reauthorization Act (P.L. 115-254).

IOWA STATE UNIVERSITY
Institute for Transportation

ACPTP
Airport Concrete Pavement Technology Program

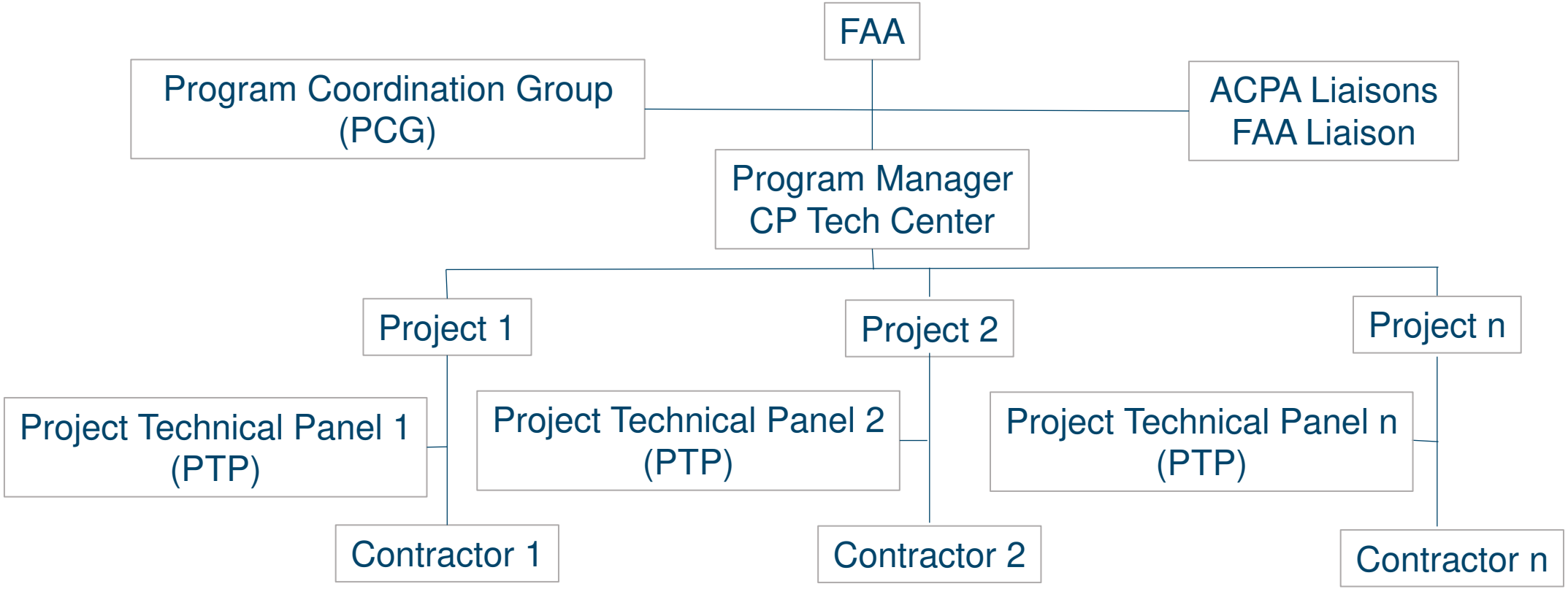
National Concrete Pavement Technology Center
CP Tech Center

Section 744 Program Objectives

(1) To re-establish the Airport Pavement Technology Program (APTP) first initiated in the early 2000s,
(2) To identify airport pavement issues and problems that could be eligible for funding through the APTP,
(3) To coordinate FAA and industry efforts to implement technologies and to solve problems identified through the program as important to the interests of FAA and industry, and
(4) To pursue the technology transfer of new solutions, practices, and recommendations as needed, resulting from the individual or collective results of implementation trials and research.
(5) To solve problems!

Overarching theme of the programs are to develop sustainability and resiliency guidelines to improve long-term pavement performance and reduce carbon emissions.

Structure


FAA
Program Coordination Group (PCG)
ACPA Liaisons FAA Liaison
Program Manager CP Tech Center
Project 1
Project 2
Project n
Project Technical Panel 1 (PTP)
Project Technical Panel 2 (PTP)
Project Technical Panel n (PTP)
Contractor 1
Contractor 2
Contractor n

Role of PCG

- Identify airport pavement issues and problems with input from the program liaisons
- To recommend and set priorities
- Review findings of the program and recommend
  - Avenues of further research
  - Technology transfer for implementation
- Direct course corrections if needed

PCG

• Brian Olsen	National Association of State Aviation Officials
• Jack Christine	American Association of Airport Executives
• Christopher Oswald	ACI—NA
• Arthur (JJ) Morton	Airport Consultant Council
• Martin Holt	American Concrete Pavement Association
• Priyanka Sarkar	Boeing
• Craig Rutland	Air Force and Tri-Services
• Anthony Cochran	FAA
• Harold Honey	FAA Liaison
• David Brill	FAA
• Gary Mitchell	ACPA Liaison

Role of the PTP

- Define the scope of the research, review available resources, and develop the Project Statement
- Review proposals, select the best proposal, and develop any technical questions or clarifications as needed
- Review the final report, establishing that the researcher did meet the intent and scope of the work as proposed

ACPTP Projects Underway

1. Mitigation Procedures for Alkali Silica Reaction
2. Performance Engineer Concrete Mixtures for Airfields
3. Repaid Repair and Rehabilitation methods for Airfields
4. Quality Control and Quality Assurance Guidance
5. Airfield Pavement Rubber Removal Best Practices
6. Effects of Diamond Grinding on Airfield Pavements
7. Design and Performance of Thin Concrete Pavements
8. Airfield Pavement Continuity—Best Practices
9. Design and Construction of Resilience Pavements (RFP development Stage)
10. Technology Transfer Program--underway

ACPTP Program Interest

No.		1	2	3	4	5	6	7
Topic		ASR	PEM	Rapid	Quality	Rubber	Grinding	Thin
Prime	41	10	9	6	5	2	5	4
Subs	**76**	15	17	16	9	3	7	9
	117							
		Clemson	AET	ARA	University NC-Charlotte	ARA	CMS	ARA
		CTL Group	Clemson U	Crawford, Murphy, & Tilly	ARA	GSS	NCE	APTech
		New York Univ Abu Dhabi	CTL Group	Global Sustainable Solutions	Tigerbrain Engineering		U of California, Davis	CMS Engineering Group
		Orgeon State	Texas A&M (TTI)	NCE	U of Missouri S&T		U of Florida	TTI
		Purdue	U of Colorado Boulder	Transtec	WSB		WSB Engineering	
		Rowan University	U of Florida	U of Missouri-Kansas City				
		U of Colorado	Missouri S&T					
		U of Florida	U of Nebraska-Lincoln					
		U of Miami	U of Oklahoma					
		UCLA						

41 Prime Contractor Submittals; 76 Sub-contractors;
Total of 117 different Universities/Companies Submitted Proposals!

1: Mitigation Procedures for ASR

- Test protocols for ASR are not ideal
- Needed:
  - Test methods for aggregates
  - Test methods for mixtures
  - Guidance on preventative actions
- Contract signed with Oregon State University
  - January 1, 2022 – March 31, 2025

2: Performance Engineered Mixtures

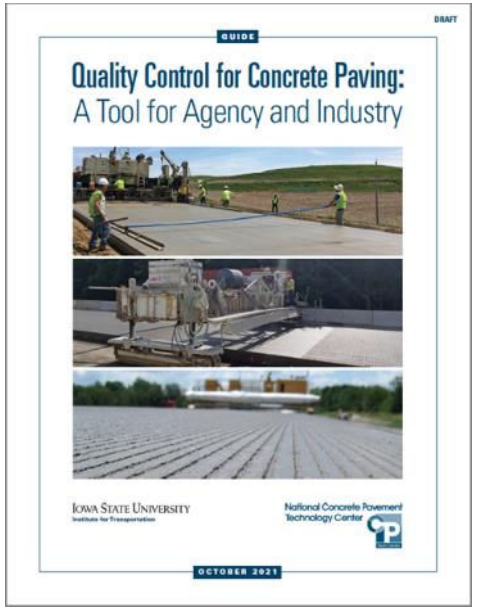
- Mixture design requirements for highways and airfields are different.
- Needed:
  - Procedures and best practices for concrete mixtures for airfield pavements
    - Define critical needs
    - Identify tests and limits
  - Specifications based on the findings
- Contract signed with Oklahoma State University
  - April 1, 2022 – June 30, 2025

3: Rapid Repair and Rehabilitation

- Research is needed to develop best practices for rapid rehabilitation using current technologies
- Needed
  - When is accelerated work needed?
  - Full depth design and detailing
  - Materials and mixtures
  - Construction practices
- Contract signed with ARA
  - March 1, 2022 – May 31, 2025

4: Quality Control and Quality Acceptance

- Quality Control/Acceptance still misunderstood
  - Different agencies have different definitions
- Needed:
  - Define and document Quality Control parameters
  - Implementation guidance — Quality Control Manual
- Contract signed with University of North Carolina - Charlotte
  - August 1, 2022 – January 31, 2025



5: Rubber Removal Best Practices

- No standard specification or guidance
- Needed:
  - When is action needed?
  - How is rubber best removed?
  - How much removal is enough?
  - What about damage to the pavement?
- Contract signed with ARA
  - February 1, 2023 – July 31, 2025

6: Effects of Diamond Grinding

- What should be the limitations on grinding?
- Needed:
  - Grind vs remove and replace?
  - Thickness reduction impacts
  - Friction impacts
  - Durability
  - Other concerns
- Contract signed with NCE
  - February 1, 2023 – January 31, 2025

7: Design and Performance of Thin Concrete Airfield Pavement

- The overall goal of this project is to examine performance of GA airfield concrete pavements less than nine inches thick
- Needed:
  - Review performance of existing GA runways
  - Identify why some have lasted and others failed
  - Recommend design procedures
  - Recommend maintenance approaches
- Contract signed with ARA
  - July 1, 2023 – December 31, 2025

8: , Concrete Airfield Paving Continuity – Best Practices Guide

- Is it preferable to start/stop a paving machine or to slow it down if concrete deliveries are insufficient?
- Needed:
  - Recommendations for specification language
    - How slow is too slow?
    - Is it better to slow paver speed, or stop
    - Should vibrator speed be linked to paver speed?
  - Guidance for contractors and inspectors
- RFP has bee released and due November 10th

9: Flooding Resilience

- Flooding is increasingly likely
- Needed:
  - How do we design to minimize impacts
  - How to prepare
  - How to rapidly return to service
- RFP in development

Coming Up…

- Fatigue/stress measurement
- What we did right
- Curing Practices
- Bond breakers
- Innovative materials (external)
- Dowelled versus undowelled joints
- others

Coming Up…

- Tech transfer products in development
  - Limestone cements
  - Strength measurements
  - Admixtures
  - Sustainability – reduced carbon footprint
    - EPD primer/life cycle analysis
    - Current technologies
    - Clinker reduction
    - Electric vehicles
    - Recycled concrete aggregates

Coming Up…

- Technology Transfer Workshops
  - Using P-501 at General Aviation Workshop
    - 1st ACPTP Workshop
    - Held in MN in May
    - 70 plus attendees
    - Well-received
    - Requested deliverance in Eastern and Central Regions
    - Interest in others—suggested to make reoccurring
  - Concrete Paving Workshop at Hershey Conference (planning)
  - Others as research results are compiled

Technology Transfer Program Training needs

- Sustainability and Resiliency
- Understanding and Applying Specifications
- General Aviation Airports versus Commercial Hub applications
- Design Engineers doing pavement design
- The role and authority of the EOR/RPR
- Dissemination of research results

Future Needs?

- Microsurface vs snow removal
- Smart gummies in joints
- Boba in non-air concrete
- Shrinkage and design
- Load transfer and dowels
- Expand Technology Transfer Training and Education Program

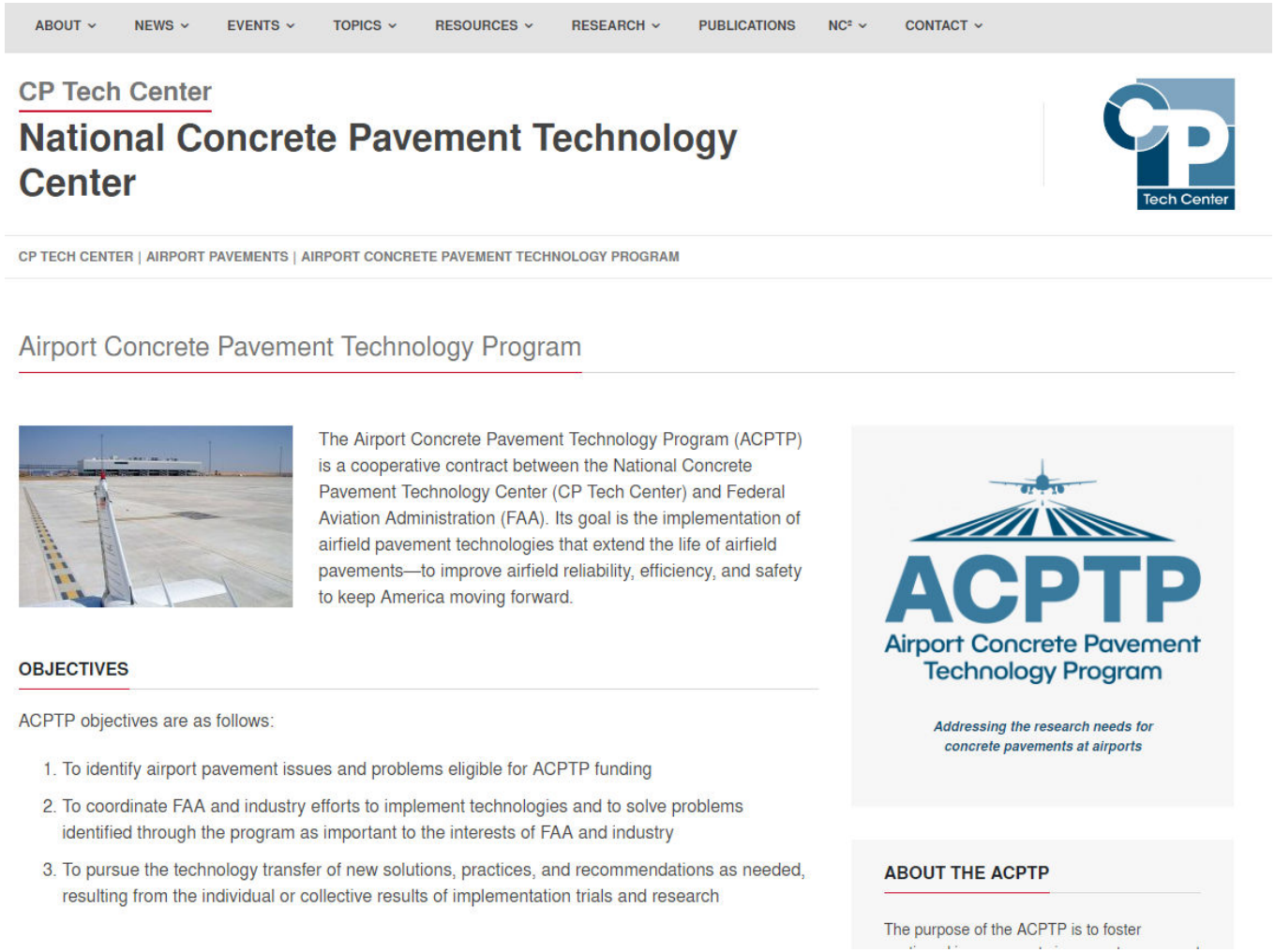
Current FAA Reauthorization Bill

- Language in both Houses with Bi-Partisan Bill Support
- Funded at $6 million per year (same as past Bill)
- Split between Rigid and Flexible Pavement Industries
- More Focus towards resiliency and sustainability initiatives

Closing

- The good news:
  - 45 proposals received over the project thus far
  - Lot of interest
  - Augment the FAA Test Center Research
  - Support changes to design procedures and Specification Guidance
- The challenge:
  - Staying on top of it all
  - Herding the project technical panels
  - Funding for FAA travel to participate
- More to come!
  - Ideas?

Web Site


ABOUT
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NC²
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CP Tech Center
National Concrete Pavement Technology Center
Tech Center
CP TECH CENTER | AIRPORT PAVEMENTS | AIRPORT CONCRETE PAVEMENT TECHNOLOGY PROGRAM
Airport Concrete Pavement Technology Program
The Airport Concrete Pavement Technology Program (ACPTP) is a cooperative contract between the National Concrete Pavement Technology Center (CP Tech Center) and Federal Aviation Administration (FAA). Its goal is the implementation of airfield pavement technologies that extend the life of airfield pavements—to improve airfield reliability, efficiency, and safety to keep America moving forward.
OBJECTIVES
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1. To identify airport pavement issues and problems eligible for ACPTP funding
2. To coordinate FAA and industry efforts to implement technologies and to solve problems identified through the program as important to the interests of FAA and industry
3. To pursue the technology transfer of new solutions, practices, and recommendations as needed, resulting from the individual or collective results of implementation trials and research
ACPTP
Airport Concrete Pavement Technology Program
Addressing the research needs for concrete pavements at airports
ABOUT THE ACPTP
The purpose of the ACPTP is to foster