Virginia Center for Transportation
INNOVATION & RESEARCH

We bring innovation to transportation.

Implementation and the Value of Research

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Purpose

- The importance of implementation
- Getting appropriate levels of funding devoted to research implementation
- How to promote and increase the implementation of research
- How to track and document implementation
- Ensuring that implementation is considered from the earliest stages of each project.

VCTIR

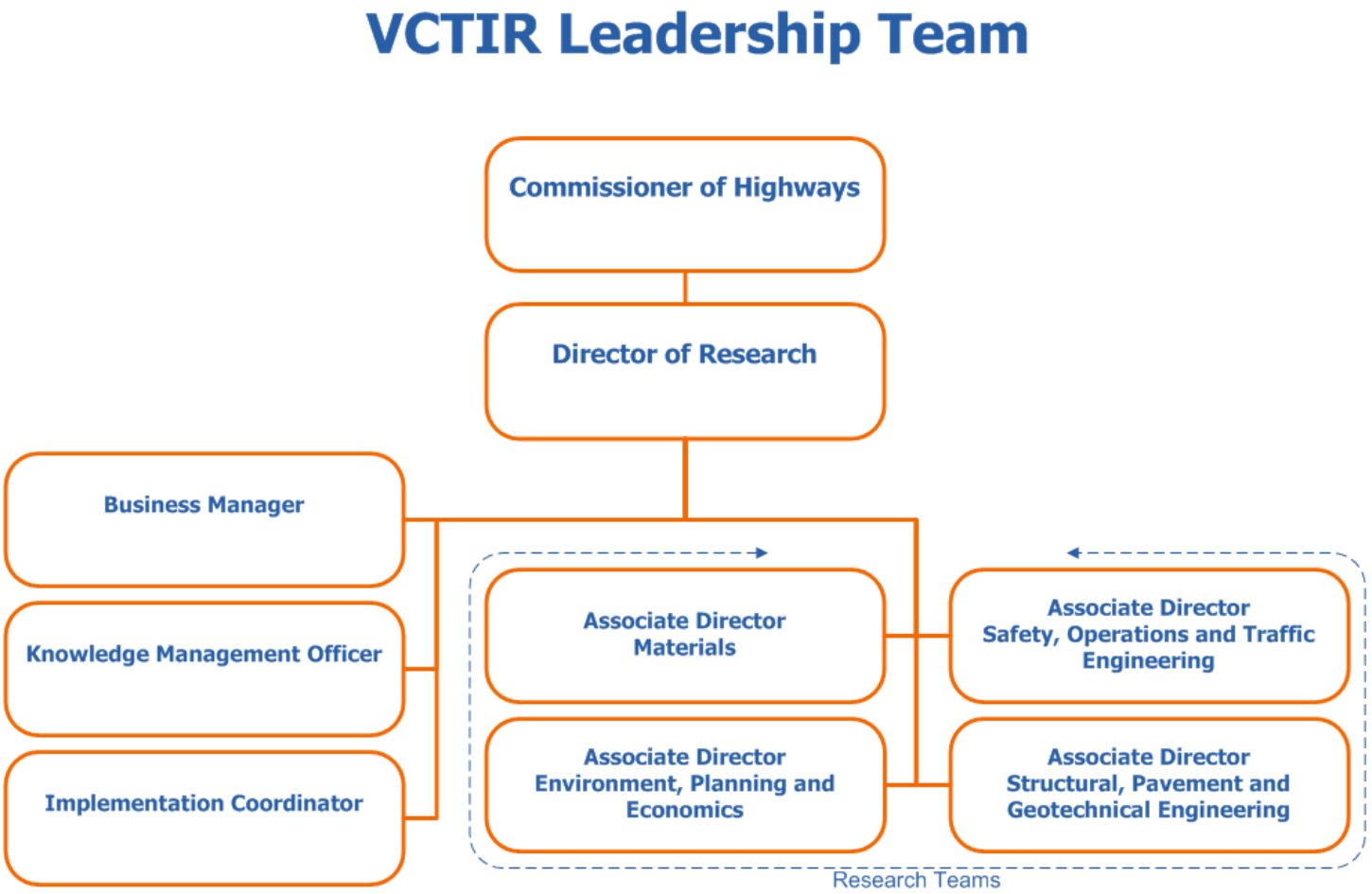
- We were established as VTRC in 1948
- We are VDOT Employees
- Our Director reports to the Deputy Commissioner
- Located at the University of Virginia
- VDOT Operates/Maintains at 50,000 mile transportation System
- 7,500 employees

VCTIR Program

- 9 RAC's
- Research Staff
  - 49 Full Time Positions
  - 15 hourly/students
  - 3 joint/contract faculty
  - 6 graduate research assistants
  - 16 undergraduate research assistants
- University Partners

- 2013 Research Investment
  - Core budget $14.6 million
  - Implementation $10.3 million
  - Other $2.3 million
- Total $27.2 million

Organization



An Interesting Event in 2010

- AUDIT
  - Validated our program
  - 52% of recommendations have been implemented
  - 27% of recommendations accepted but not fully implemented
  - Research is Relevant but under-utilized
  - Our Name was changed - VCTIR

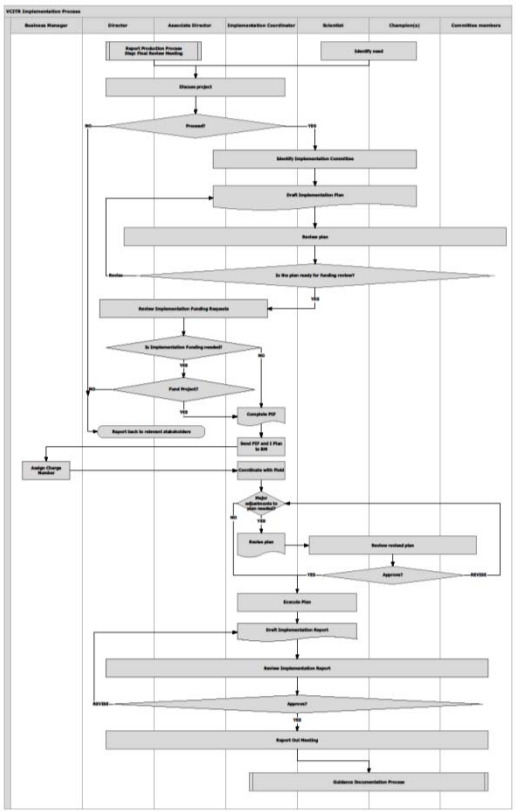
Commissioner took Action

- Implementation will be considered as you establish a Research Project
- Sights are to be Set on Implementation
- The **Agency Will Implement** the recommendations that arise from Research
- VCTIR will designate an individual who will focus exclusively on Implementation
- I will Allocate $10 million annually to fund implementation

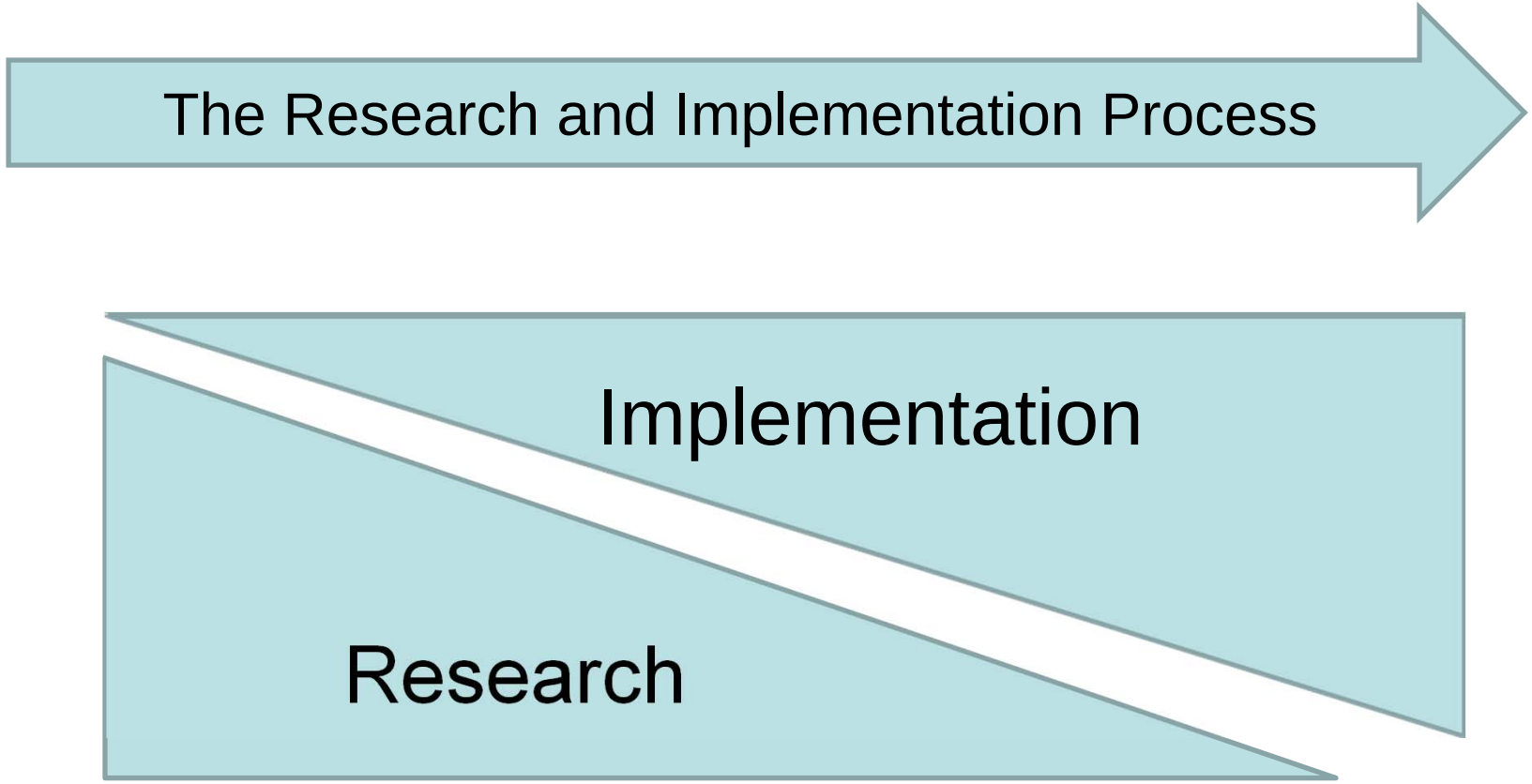
VCTIR Responded

- Robust Structure – 9 Research Advisory Committees
- Commissioner who wanted results
- $10 million – Annually – State Funds
- Backlog of implementable recommendations
- New Challenges were coming quickly

Implementation Process



- Process is important because
  - Needed to be able to track and document implementation,
  - Going through the exercise of developing a formal process **with key stakeholders** allows for several things:
    - Allows you to develop formal practices based on informal experience
    - Allows for people to see how everyone understands the process. There is usually a lot of variation.
    - Acknowledging the variation allows people to develop a common understanding.
  - Recognize the moving parts
  - Figure out the Relationship between Research & Implementation


The Research and Implementation Process
Implementation
Research

Research Briefs
Marketing to Ourselves

RESEARCH BRIEF

Final Report VCTIR 12-R9
June 2013 (report published 06/29/12)

USE OF PRECAST SLABS FOR PAVEMENT REHABILITATION ON I-66

Principal Investigators: M. Shabbir Hossain, Ph.D., P.E., Senior Research Scientist, (434)293-1989 and Celik Ozyildirim, Ph.D., P.E., Principal Research Scientist, (434)293-1977, VCTIR

Perspective Precast concrete slabs (panels) have been used for more than 10 years to build and repair pavements. They allow faster construction and are more durable than cast-in-place (CIP) concrete. Precast panels are cast and cured off-site with better quality control than CIP concrete. They can be deployed rapidly, helping minimize safety hazards and traffic delays associated with CIP concrete. Michigan, Texas, and California are among the states that have successfully used precast systems.

This study documented the construction and initial performance of two precast systems used to rehabilitate highway pavement in Northern Virginia. Everyone involved found the constructability of the systems to be satisfactory. Surveys after 18 months indicated satisfactory pavement performance. Highway repairs with precast concrete systems initially cost more than with CIP but should last longer. The higher cost can be justified to limit congestion and other impacts to motorists in high-volume traffic areas where extended lane closures are not feasible, such as the interstate system.

Background VDOT received incentive funding from FHWA's Highways for LIFE program for this demonstration project on a 0.2-mile four-lane section of I-66W between Exits 60 and 57 near Washington, D.C., and on a curved section of a nearby 0.7-mile two-lane exit ramp on to U.S. Route 50W. The contractor placed precast concrete pavement (PCP) slabs on part of the ramp.

Precast Concrete Pavement System

The PCP system used reinforced slabs with doweled joints that were cast to match the ramp curvature and super-elevation. Prestressed precast concrete pavement (PPCP) slabs were used in the straight section on I-66W.

Prestressed Precast Concrete Pavement System

Transversely prestressed panels were longitudinally post-tensioned together at the site to reduce the chances of cracking, and provide continuity at the joints.

Research and Recommendations The contractor constructed trial sections of PCP and PPCP off-site to identify and resolve construction challenges. Elements requiring special attention included base preparation, placement and matching of slabs, grouting operations, quality control of precast fabrication, alignment of post-tensioning ducts, development of ways to avoid corner cracks and edge spalling during installation, the tying together of adjacent lanes, and the securing of post-tensioning strands.

After 18 months of traffic, observations included some deterioration of PPCP expansion joints and minor cracking at or near patches for lifting hooks, grouting holes, or post-tensioning block-outs. Although the PCP slabs showed a few mid-slab cracks at traffic opening, they were still tight and stable. The study recommends that VDOT consider both types of precast systems as options when rapid construction and longevity are needed, and that VDOT continue evaluating nationwide improvements for precast systems.

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- Perspective
  - Why
  - Accomplishment
- Background
  - What is the question
  - Who Asked
- Research & Recommendations
  - Procedure
  - Results

Accomplishments

- 50+ Funded Implementation Projects Underway.
- Process Document is 90% complete
- Marketing Program Started
- Moving Research Project Recommendations
  - from Implementation Projects
  - to Agency Standard Practice

Monetary Benefits of Research

	1 year return period	5 year return period
Fiscal Year 2006	$80,588,388	$393,541,940
Fiscal Year 2007	$36,492,758	$182,463,790
Fiscal Year 2008	$16,851,000	$84,255,000
Fiscal Year 2009	$23,519,059	$117,595,295
Fiscal Year 2010	$7,006,366	$17,175,830
Fiscal Year 2011	$10,321,931	$48,909,655
Fiscal Year 2012	$68,620,905	$317,465,517
5 year average (FY2008-FY2012)	**$27,135,337**	**$127,977,515**

Parting Shots

- According to the IC, it's a matter of "taking what people know in one place, and combining it with what people know in another." In other words, implementation is the activity of taking new knowledge developed through scientific research, and successfully integrating it into what people already know about doing their work, which they have developed over years and decades of practice
- When are we finished?
  - When the project becomes
    - the SOP for the agency,
    - the way the agency does business
    - When it is generally accepted
    - Integrated into the fabric of daily work
- " Today, I am still implementing technology we discovered more than 35 years ago."

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