

INSTYTUT BADAWCZY
DRÓG I MOSTÓW

ROAD AND BRIDGE
RESEARCH INSTITUTE



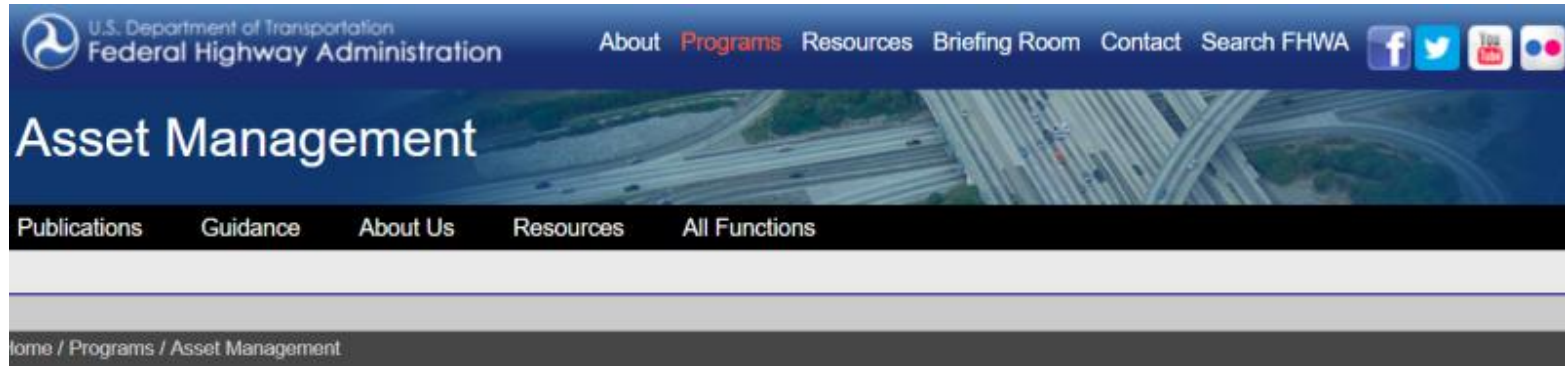
DOŚWIADCZENIA AMERYKAŃSKIE W PROAKTYWNYM ZARZĄDZANIU DROGAMI

dr hab. inż. **ADAM ZOFKA** prof. nadzw. IBDiM

Sekretarz Naukowy IBDiM

Ekspert OECD, Policies to extend the life of road assets

Intro



Intro

Time	Session Title				
10:30 AM	Data: 1. Data Collection to Support TAM Decisions 	Implementation: 1. Performance Management 	Investments: 1. Rapid Fire Session: Investment Tradeoffs 	Org/Workforce: 1. Advancing Asset Management Research and Education Using Case Studies 	TAMPs: 1. State DOT TAMP Development 
1:30 PM	Implementation: 6. ...				
3:30 PM	Implementation: 6. ...				
Time	Session Title				
8:30 AM	TAMPs: 4. Risk and Resilience in the TAMPs 	Implementation: 2. Making Asset Management Decisions 	Investments: 5. Investment Resources for Asset Managers 	Org/Workforce: 6. Discussion: Getting Started Implementing Your Plan to Make Asset Management Work 	TAMPs: 3. Group Transit Asset Management Plan Development 
10:30 AM	Data: 5. Discussion: The Data Governance Road Less Traveled – What Did Your Agency Learn Along the Way? 	Implementation: 4. Cross Asset Prioritization 	Investments: 6. Closing Session - Panel on Optimizing Investments 	Org/Workforce: 4. Asset Management within Transit Organizations 	TAMPs: 6. Coordinating Your TAMPs: Addressing Assets You Don't Own and Local Agencies You Don't Own 
1:30 PM	Data: 4. "Is the Sky Really Falling" Communicating TAM Results 	Implementation : 5. Building and Inventory and Assessing Condition 	Investments: 7. Discussion: Bridging the Gaps Between Research and Implementation 	Org/Workforce: 3. Communicating Asset Management 	TAMPs: 5. Advancing Practices in Strategic TAMP Development 



Focus

In precision-driven Germany, crumbling bridges and aging roads

Germany — yes, Germany — has an infrastructure problem

Elizabeth Schulze | @eschulze9

Published 10:36 AM ET Wed, 14 Sept 2016 | Updated 1:01 PM ET Wed, 14 Sept 2016



Japan Begins to Tear Down Aging Infrastructure

FALLING APART: AMERICA'S NEGLECTED INFRASTRUCTURE

Steve Kroft reports on why our roads, bridges, airports and rail are outdated and need to be fixed

2014
NOW 92

CORRESPONDENT

STEVE KROFT

FACEBOOK

TWITTER

REDDIT

FLIPBOARD

The Economist

Falling apart

'Old' is the new 'New' - Britain's aging infrastructure

IN CASE YOU MISSED IT: "60 MINUTES" – "FALLING APART: AMERICA'S NEGLECTED INFRASTRUCTURE"

HOME > NEWS > IN CASE YOU MISSED IT: "60 MINUTES" – "FALLING APART: AMERICA'S NEGLECTED INFRASTRUCTURE"

INFRASTRUCTURE

Thousands Of American Bridges Are Falling Apart

by [Niall McCarthy](#), Jan 31, 2018

States with the riskiest roads, bridges and dams

Samuel Stebbins, 24/7 Wall Street

Published 8:22 a.m. ET Oct. 26, 2017 | Updated 11:59 a.m. ET Dec. 14, 2017

Japan's Aging Infrastructure

America's infrastructure is falling apart — here's a look at how bad things have gotten

Cadie Thompson



Feb. 12, 2018, 10:20 AM 388,668

Trump pledges to fix infrastructure but \$200bn plan falls well short

There's a \$1 trillion crisis threatening the American way of life as we know it

Cadie Thompson



Mar. 6, 2017, 1:21 PM 75,875



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The Post and Courier: Infrastructure: Falling Apart, Falling Behind



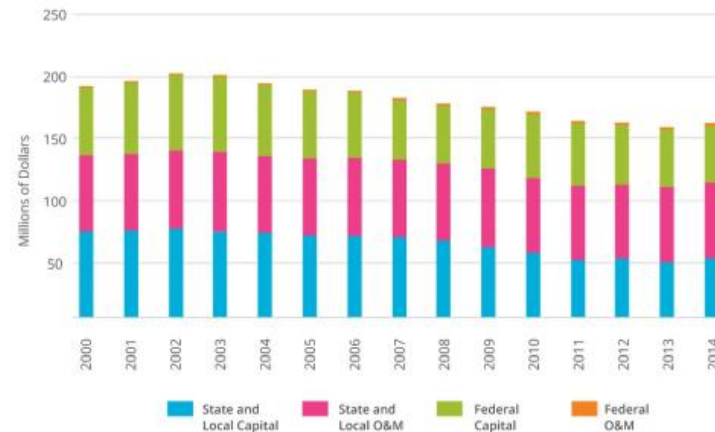
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DLACZEGO ????

**COSTING
MOTORISTS
\$121
BILLION/YEAR
IN EXTRA VEHICLE REPAIRS
AND OPERATING COSTS**

**21% OF THE NATION'S
HIGHWAYS ARE IN
POOR CONDITION**

Public Spending on Highway Infrastructure



DLACZEGO ????

→ Powody:

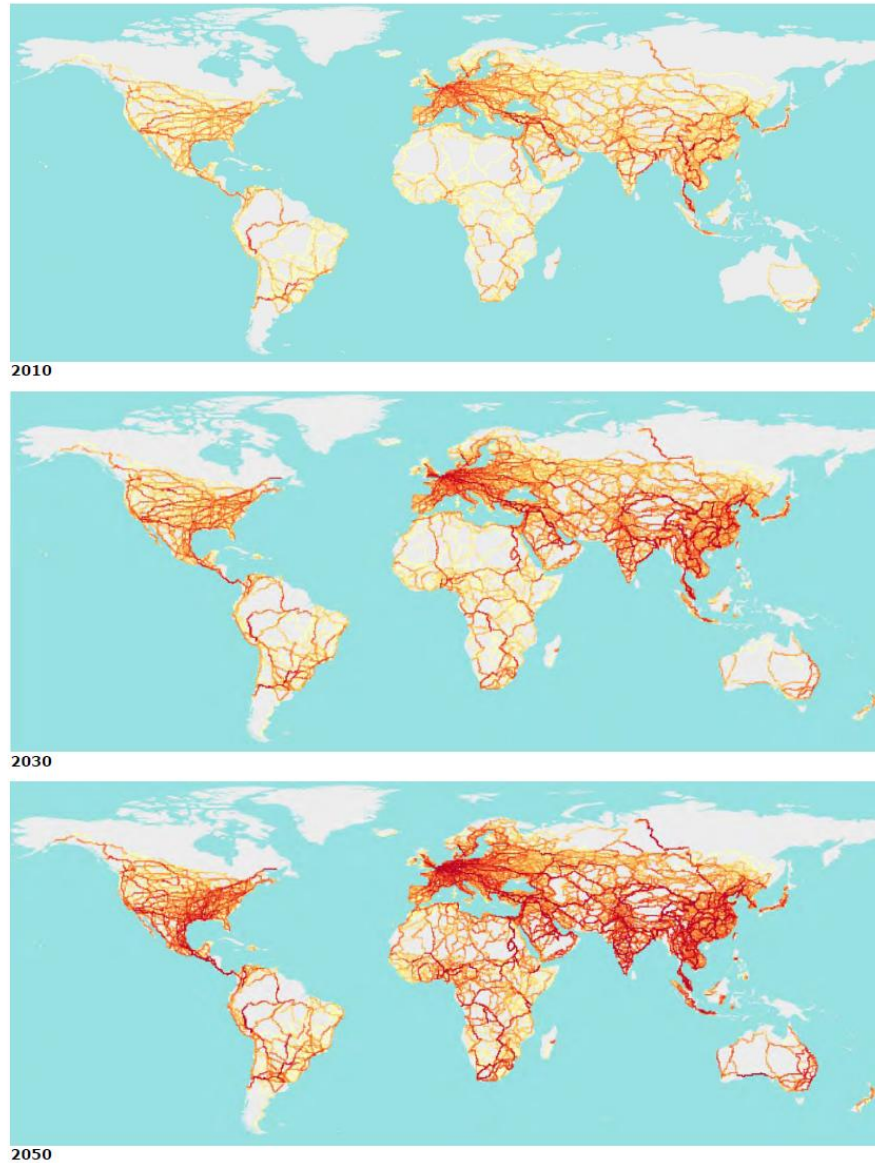
- Polityczne
- Ekonomiczne
- Społeczne
-

→ **Niewłaściwe zarządzanie**

- Niezrównoważona alokacja środków
- Przeinwestowanie w inwestycje
- Szerzej, niewłaściwa **strategia długoterminowa**

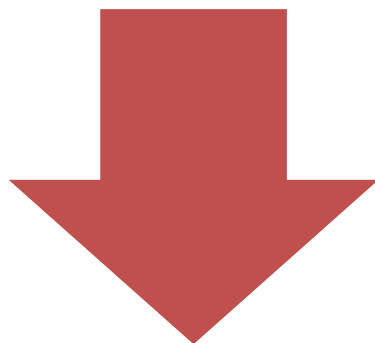


Figure 8. Surface freight spatial density in 2010, 2030 and 2050



Strategia

Duże ryzyko



REAKTYWNA

Czekać

Co się stało?

Jaki jest najniższy koszt naprawy?



PROAKTYWNA

Kiedy interweniować?

Co zrobić?

Jakie będą konsekwencje społ.-ekon.?



Małe ryzyko

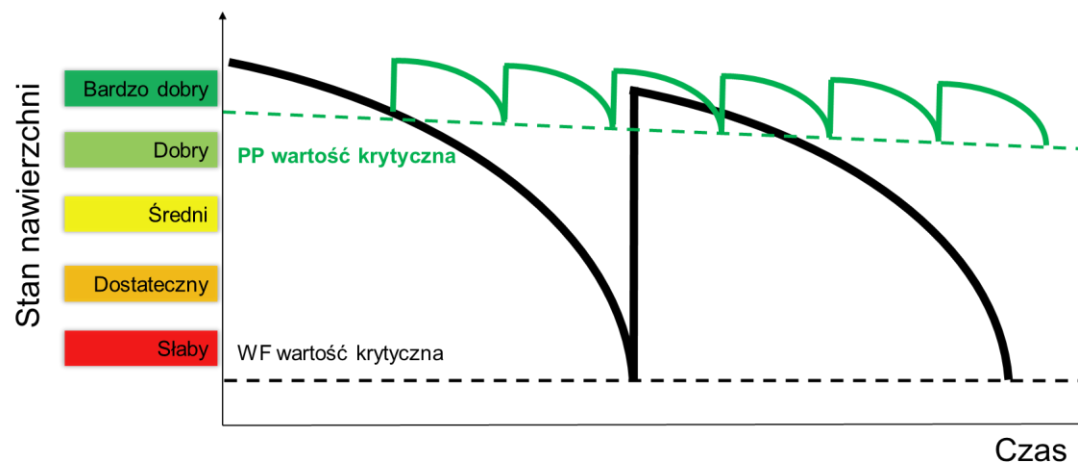
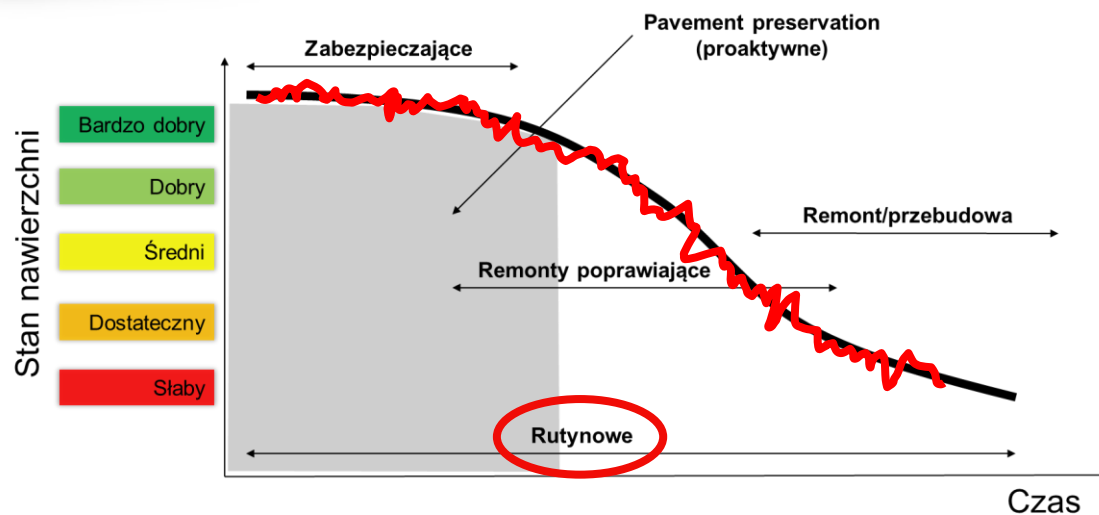


Proaktywne zarządzanie

- To nie jest PMS
- To jest długo-falowa świadoma **strategia** bazująca na analitycznych zasadach
- Umożliwia uwzględnienie różnych aspektów i procesów biznesowych
- Zrównoważona polityka: zabezpiecza przez kumulacją problemów w przyszłości
- Utrzymanie sieci w dobrym stanie



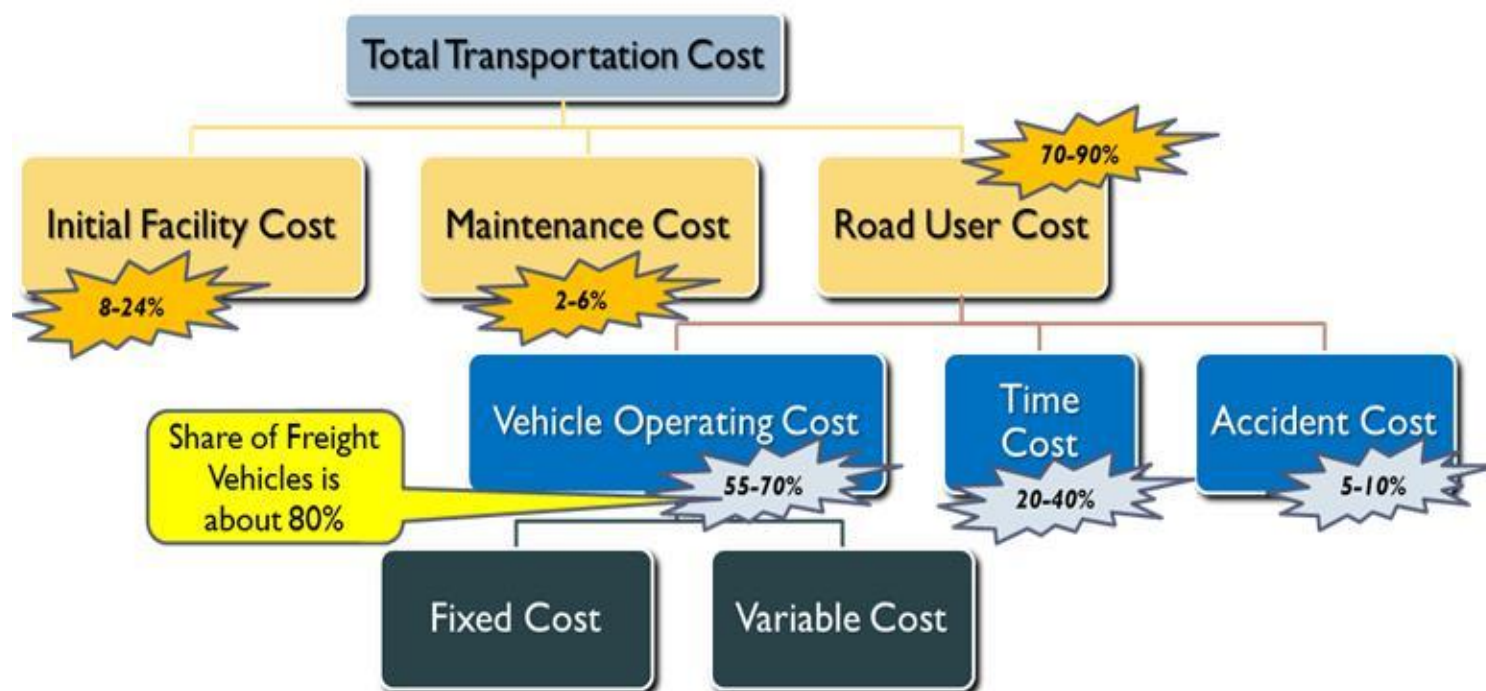
Kontrolowane utrzymanie



Dygresja, 1

- **Strategia**
- Narzędzia (np. ekonomiczne – NPV, systemowe – PMS)
- Narzędzia są niezbędne do wdrożenia strategii
- Stan aktualny vs. wieloletnie planowanie
- Value engineering, LCCA, LCA
- Aspekty
 - techniczne
 - BRD
 - środowiskowe
 - społeczne

Raport z RPA



Dygresja, 2

- Proaktywne zarządzanie
 - USA: **pavement preservation**
 - Z definicji nie zawiera zabiegów poprawiających nośność
 - Keep roads in good condition
 - **The right treatment, to the right pavement, at the right time**

Dygresja, 2

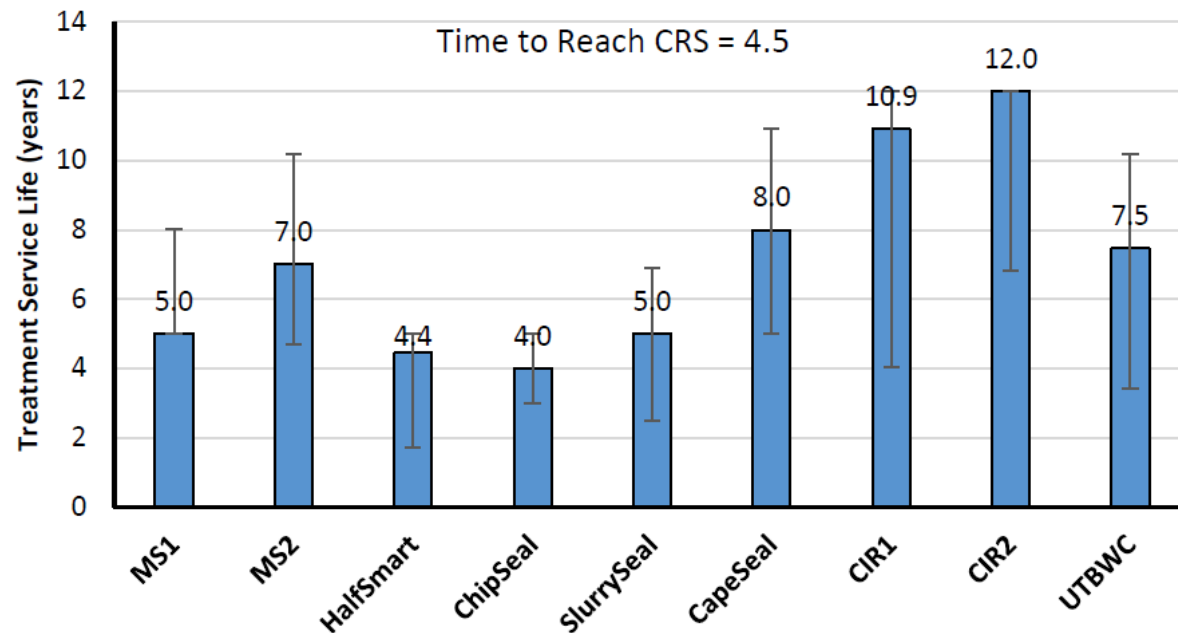
- USA: pavement preservation
- Przykłady zabiegów (IL)

Table 2.1. Pavement Preservation Treatments for Flexible and Rigid Pavements

Treatments for flexible pavement	Treatments for rigid pavement
Crack filling and sealing	Crack sealing
Fog seals	Joint resealing
Sand seals	Diamond grinding
Slurry seals	Diamond grooving
Micro-surfacing	Ultra-thin bonded wearing course (UTBWC)
Bituminous surface treatments (chip seals)	Full-depth repair
Cape seals	Partial-depth repair
Cold in-place recycling (CIR)	
Hot in-place recycling (HIR)	
Surface Maintenance at the Right Time (SMART) overlay	
Half-SMART overlay	
Ultra-thin bonded wearing course (UTBWC)	
Cold milling	

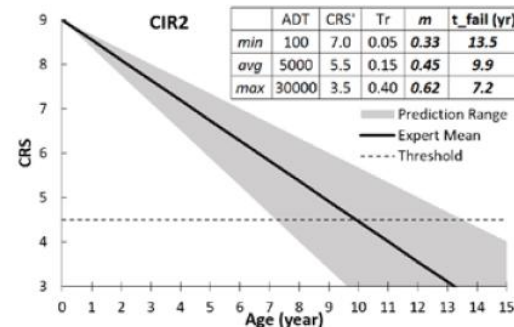
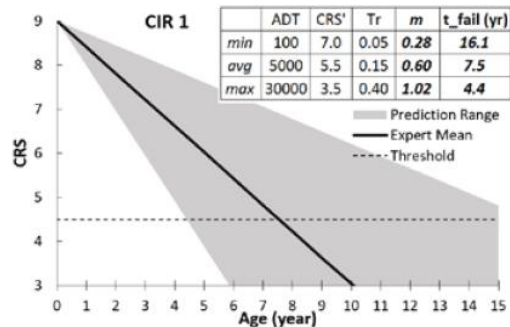
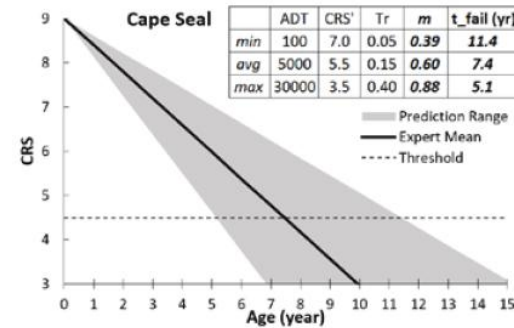
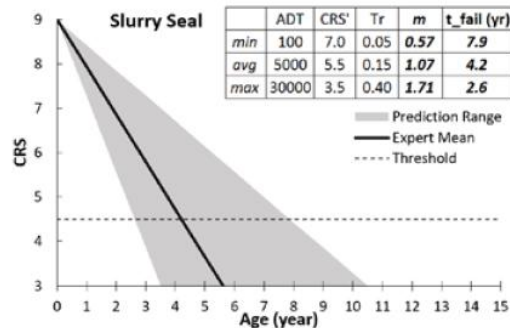
Dygresja, 2

- USA: pavement preservation
- Przykłady zabiegów (IL)



Dygresja, 2

- USA: pavement preservation
- Przykłady zabiegów (IL)



Dygresja, 2

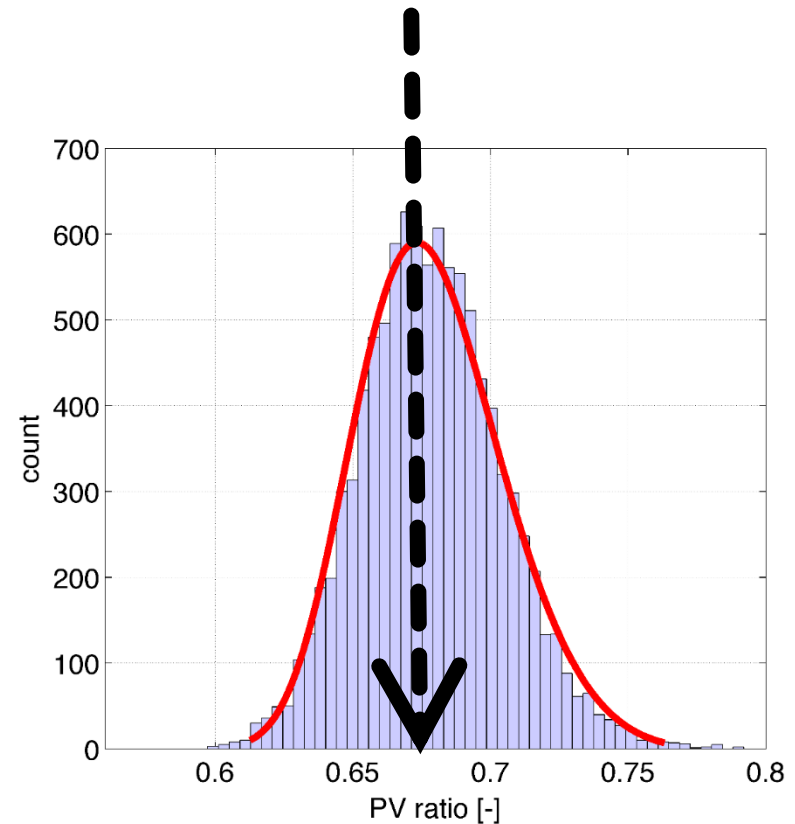
- USA:
pavement
preservation
- Przykłady
zabiegów
(MN)

Pavement Conditions	Severity Level ¹	Crack Filling	Crack Sealing	Micro-Surfacing*	Chip Seal	Thin HMA Overlay*	UTBWC*	Rut Filling
Transverse Cracking	Low							
	Medium							
	High							
Longitudinal Cracking	Low							
	Medium							
	High							
Longitudinal Joint Cracking	Low							
	Medium							
	High							
Multiple Cracking	Low							
	Medium							
	High							
Alligator Cracking	Low							
	Medium							
	High							
Rutting	Low							
	Medium							
	High							
Raveling and Weathering	Low							
	Medium							
	High							
Patching	Low							
	Medium							
	High							
RQI	3.0 - 4.0							
	2.0 - 2.9							
	1.0 - 1.9							
ADT	<2,500							
	2,500 - 10,000							
	> 10,000							
Friction	Poor							

Dygresja, 2

→ Przykład autorski, porównanie reaktywnej i proaktywnej strategii

- Uwzględnione koszty:
 - Eksploatacji pojazdów
 - Czas stracony
 - Zabiegów
 - Brak: hałasu, zanieczyszczenia powietrza, brd,
- Okres analizy 30 lat
- Monte Carlo



Dygresja, 3

→ Proaktywne zarządzanie

→ Można także rozpatrywać w szerszym kontekście jako strategię zarządzania majątkiem, która uwzględnia możliwe do przewidzenia przyszłe wyzwania (*challenges*), np. zmiany klimatyczne, automatyzacja, zmiany w natężeniu ruchu i budowie pojazdów etc.

→ W rzeczywistości, część zabiegów będzie zawsze **reaktywna**

Dygresja, 3

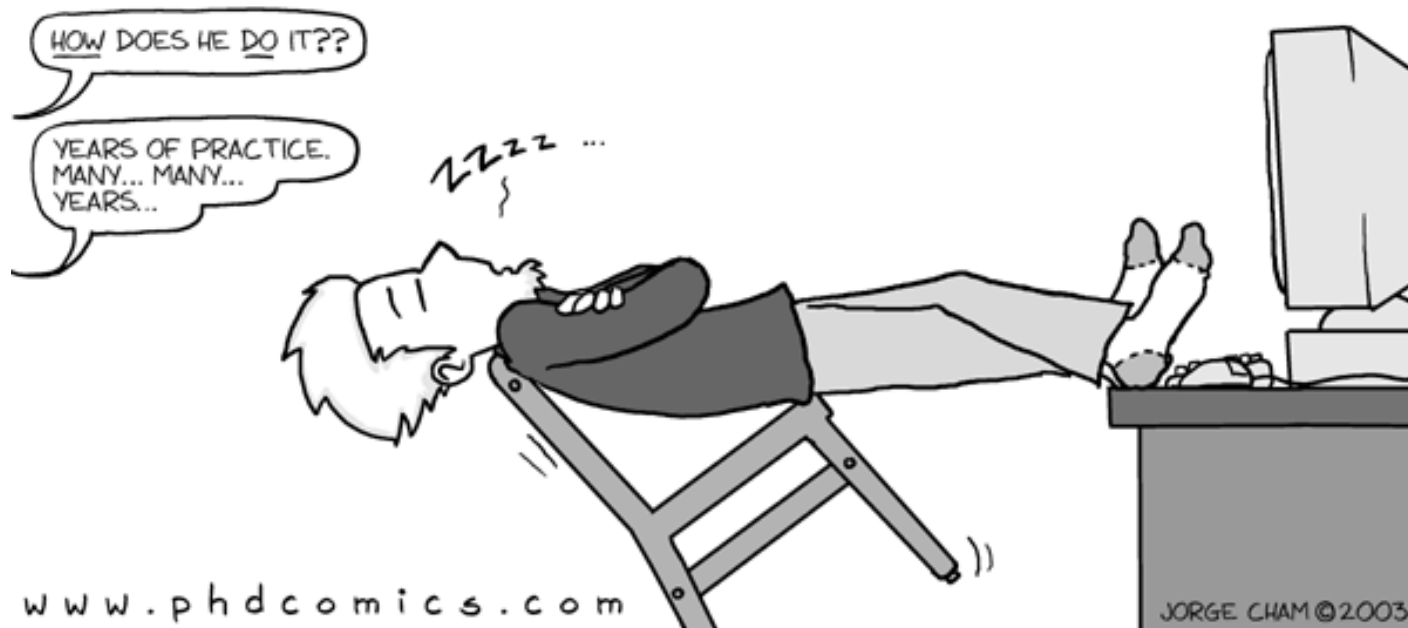
We must act in a responsible way

Deferred maintenance is a disinvestment

Inadequate maintenance affects not only the present generation but places undue financial burden on future generations.

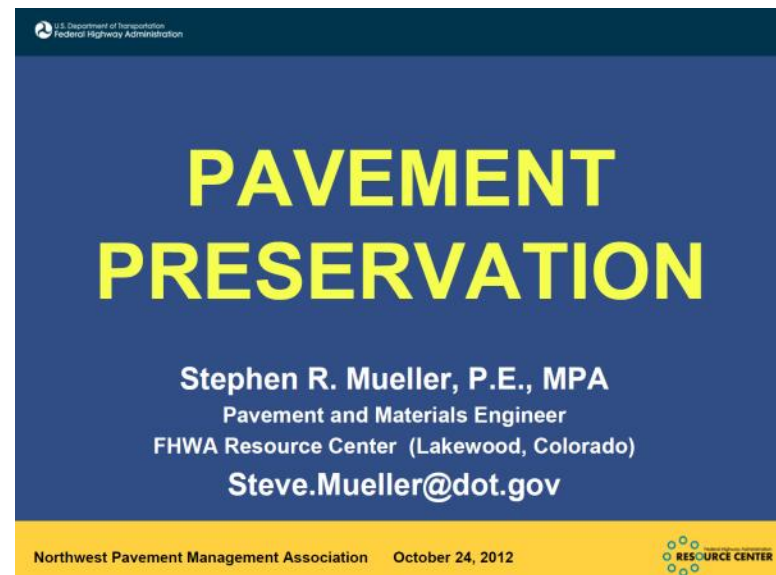


Inicjatywy



Inicjatywy

1. Instytucjonowanie PP
2. Szkolenia
3. Badania i rozwój (R&D)
4. Marketing/komunikacja społeczna



US highway system

Jurisdictions	Miles	Percentage
Federal	131,559	3
States	784,310	19
Locals	3,143,471	78
TOTAL:	4,059,340	100%

Partnerships are Required

1 FHWA

52 State DOTs (including DC and PR)

3,034 County governments;

35,933 Municipal, Town and Township governments.

4,140 Colleges and Universities

_____ contractors/industry reps.

Strategy

History Prior to 1992

- ▶ Most current preservation treatments were used prior to 1992—called maintenance. Since then:
 - Materials have changed
 - Equipment has changed
 - Design practices have not changed as much
- ▶ Maintenance treatments perceived primarily as reactive, not preventive
 - Often considered for low volume roads
 - Designed by art not science
- ▶ Used worldwide by federal, state and local agencies



Jak było i co jest teraz

Early Challenges

- ▶ Preservation did not fit the highway bill as it was more than maintenance
- ▶ Many HMA contractors did not support it because it took market share from them
- ▶ Persistence paid off

Current Efforts

- ▶ Lobbying to raise the bar for pavement preservation
- ▶ Support for the National Center
- ▶ Carrying the message to the states through the AASHTO TSP-2 program and national conferences



Pavement Preservation Expert Task Group (PPETG)

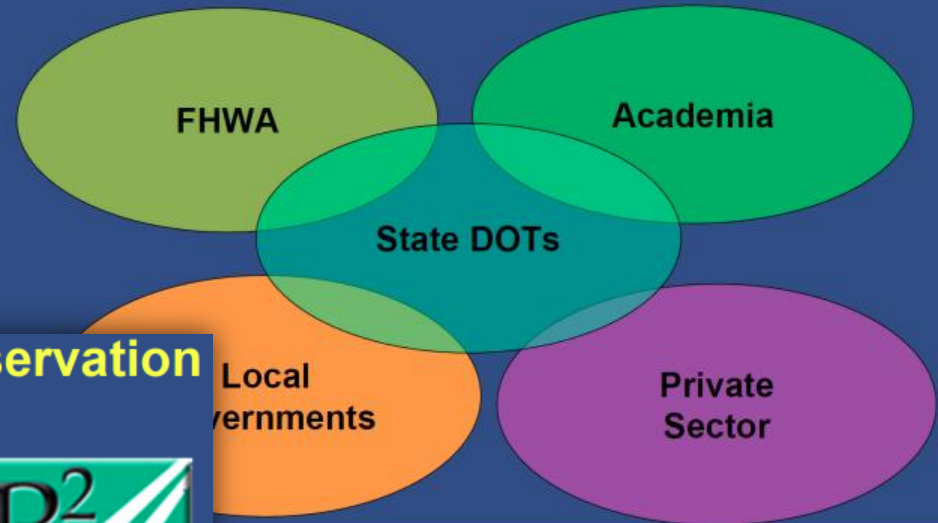
Brainchild of Jim Sorenson

Formed in 1992

Composed of Representatives from State DOTs, Industry, and Academia

Preservation

Partnerships Are Required



Foundation for Pavement Preservation

Formed in 1992

AEMA, ARRA, ISSA founding members

Worked with FHWA and PPETG to produce many products

Jerry Eller, former FHWA Chief Engineer eventually became the Executive Director



Memorandum on Preventive Maintenance Eligibility

From: King W. Gee, Associate Administrator for Infrastructure

Dated: October 8, 2004

<http://www.fhwa.dot.gov/preservation/100804.cfm>

Definitions Memorandum

From: David R. Geiger, P.E.
Director, Office of Asset Management

Dated: September 12, 2005

<http://www.fhwa.dot.gov/pavement/pre>

ervation

Transportation System Preservation Technical Services Program



Resolution PR-10-05

Approved by the Board of Directors

May 8, 2005

Transportation System Preservation Technical Services Program (TSP²)

Phase 1: Pavement Preservation

Phase 2: Bridge Preservation

Phase 3: Regional Partnerships

www.pavementpreservation.org



Midwestern
Northeast
Southeastern
Rocky Mountain West

www.tsp2.org

AMERICAN ASSOCIATION OF
STATE HIGHWAY AND
TRANSPORTATION OFFICIALS
AASHTO
THE VOICE OF TRANSPORTATION



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FP², Inc.

In 2007, the Foundation for Pavement Preservation was dissolved, and FP2, Inc. was created.

Changed from a 501 c(3)
To a 501 c(6) organization to
enable a higher level of
political involvement under the
IRS codes.

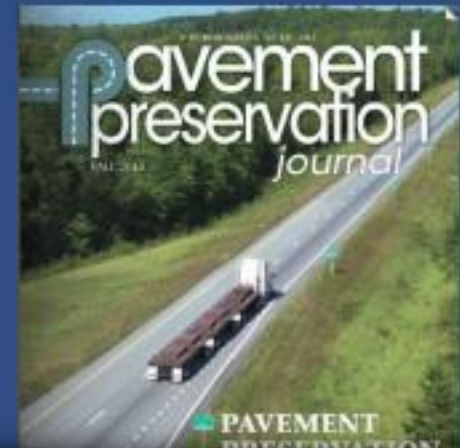


Pavement Preservation Journal

Published by FP2, Inc.

1st Published in 2007

Supported through
advertising



MAP-21 – the New Law

Moving Ahead for Progress in the
21st Century Act (MAP-21)
surface transportation legislation
enacted July 6, 2012 contains
language both **specifically**, and
more generally, helpful to pavement
preservation. (quote from www.fp2.org)

<http://www.fhwa.dot.gov/map21>



Memorandum

Subject: Guidance on Highway Preservation
And Maintenance

Date: FEB 25 2016

From: Walter C. Waidelich, Jr.
Associate Administrator for
Infrastructure

A handwritten signature in black ink, appearing to read 'W. Waidelich, Jr.', is written over the printed name and title.

In Reply Refer to: HIAP-30

To: Directors of Field Services
Federal Lands Highway Division Engineers
Division Administrators

Szkolenia (training) FHWA

→ + konferencje

→ + support

 U.S. Department of Transportation
Federal Highway Administration

National Highway Institute Training

131103 A, B, C – Pavement Preservation: Design and Construction of Preventive Maintenance Treatments

131104 – Pavement Preservation: Integrating Pavement Preservation Practices into Pavement Management

131106 – Transportation Asset Management

131114 - Pavement Preservation: Optimal Timing of Pavement Preservation Treatments

131115 – Pavement Preservation: Preventive Maintenance Treatment, Timing, and Selection

131116A – Pavement Management: Characteristics of an Effective Program

www.nhi.fhwa.dot.gov



NHI Preservation Training - FREE

131110 – Pavement Preservation Treatment Construction – WEB-BASED

- HMA Treatments
- PCC Treatments
- HMA Overlay Inspection

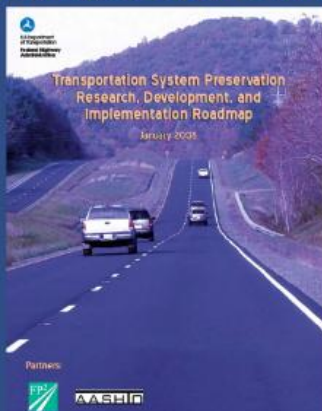
TCCC: www.nhi.fhwa.dot.gov/tccc



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Badania (R&D)

Transportation System Preservation Research Roadmap



<http://www.tsp2.org/roadmap/index.php>

Research Efforts through the Transportation Research Board



TRANSPORTATION RESEARCH BOARD
OF THE NATIONAL ACADEMIES

Pavement Preservation (AHD18)

Committee Scope:

This Committee is concerned with identifying and supporting research on the application of scientific principles to quantify preservation activities and their benefits to the transportation roadway infrastructure; developing, applying and evaluating scientific approaches to assess materials, processes, methods and procedures involved in cost-effectively extend the performance-life of transportation pavement sections and networks; and, promoting an understanding and use of effective preservation practices and procedures through dissemination and education activities for practitioners and researchers.

<http://pavementpreservationcommittee.org/>

Badania (R&D) - NCHRP

- NCHRP 342
- NCHRP 411
- NCHRP 720
- NCHRP 736
- NCHRP 858
- NCHRP 859
- NCHRP 866
- ...

NCHRP REPORT 720

**Estimating the Effects
of Pavement Condition
on Vehicle Operating Costs**

NCHRP REPORT 736

**Resource Allocation Logic
Framework to Meet Highway
Asset Preservation**

NCHRP RESEARCH REPORT 859

**Consequences of
Delayed Maintenance
of Highway Assets**

Badania (R&D)

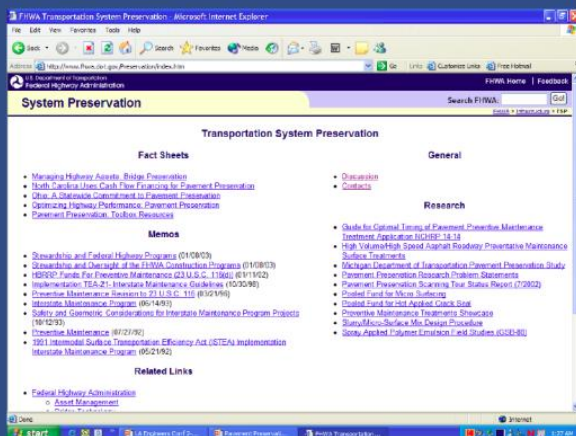
- Ciągłe się rozwija
 - Technologia
 - Automatyzacja
 - Materiały
 - Procesy biznesowe
- Empiryczne → racjonalne, inżynierskie, biznesowe

Marketing & komunikacja

- PR strategy
- Interviews, open-houses, online activities

FHWA WEBSITE

www.fhwa.dot.gov/preservation



Marketing & komunikacija

Pavement Preservation Mantra:

Apply the *right* treatment...

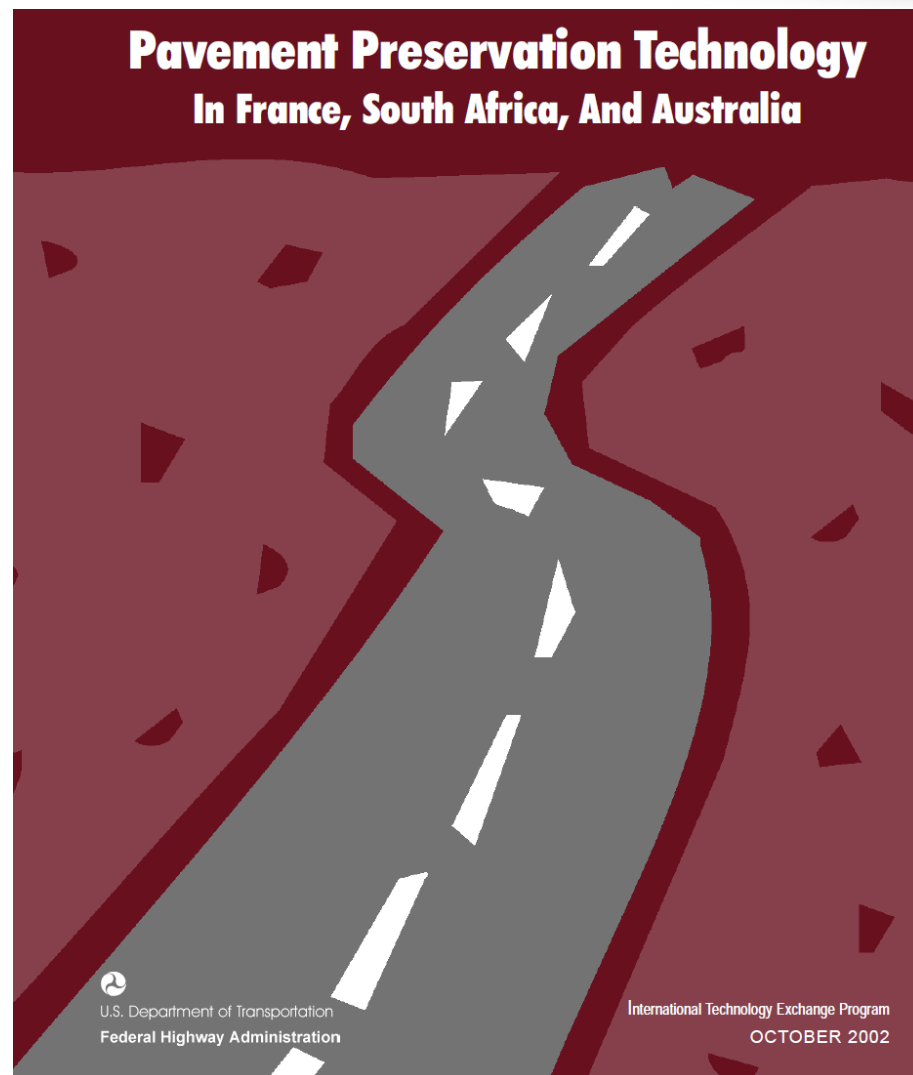
...to the *right* road...

...at the *right* time.

Use Engineering!

Inne kraje

- *Uczą się*
- *Podobnie jak z WMA*



Dziękuję za uwagę



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Adam Zofka

azofka@ibdim.edu.pl