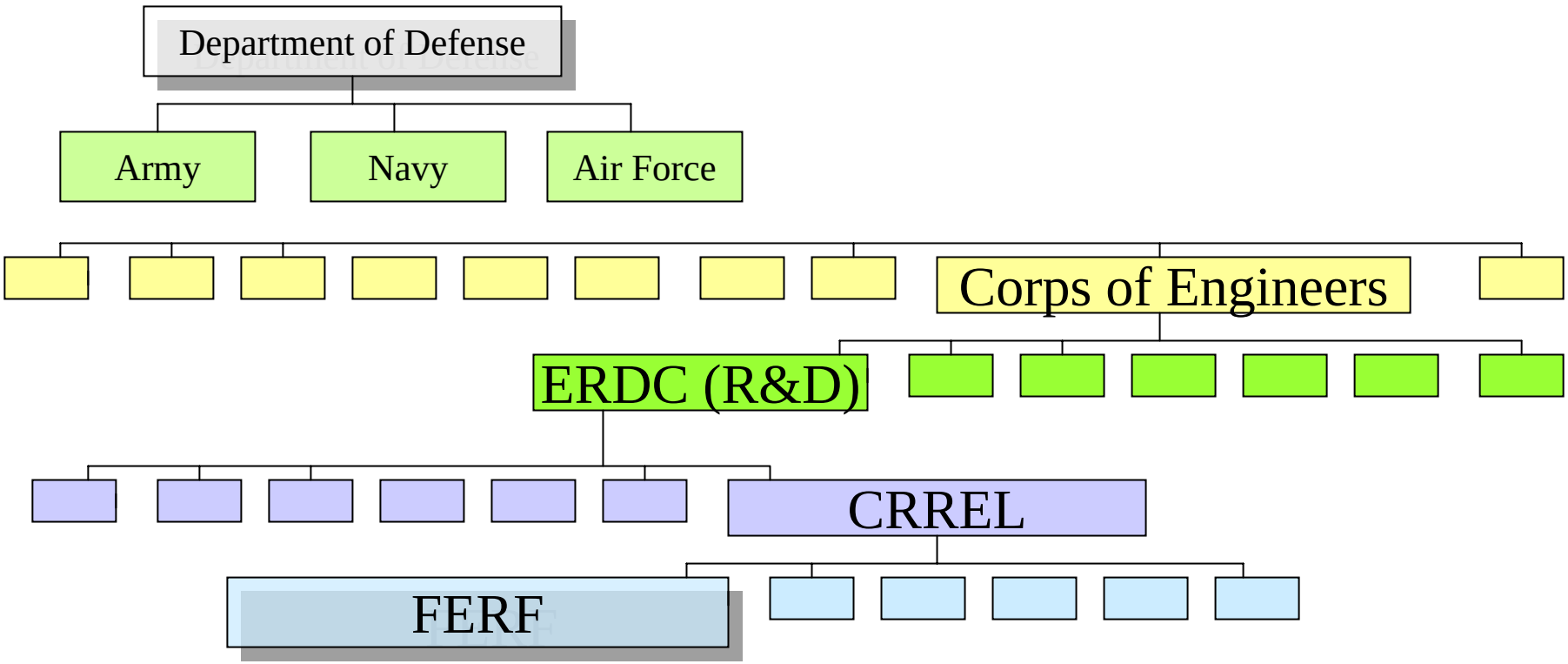
Frost Effects Research Facility

Accelerated Pavement Testing at CRREL

September 2006 Update
by
Edel Cortez

US Army Corps of Engineers ®
Cold Regions Research & Engineering Laboratory

FERF as a part of the US Government



FERF Facilities

FERF Current Projects

1. Subgrade Performance Study

   Scheduled for completion in January 2007.

2. Geogrid Base Course Reinforcement

   Scheduled for completion in August 2007.

Pavement Subgrade Performance Study

National Pooled Fund Study

SPR2-(208)

- **Pennsylvania**
- **California**
- **Texas**
- **New Hampshire**
- **Connecticut**
- **New York**
- **Kansas**
- **Florida**
- **Minnesota**
- **Indiana**
- **Alaska**
- **Alabama**
- **Georgia**
- **Oregon**
- **Ohio**
- **Montana**
- **Nebraska**
- **Idaho**
- **North Dakota**
- Texas Research Institute
- Cornell University

U.S. Department of Transportation Federal Highway Administration

CTOR
Katherine Petros
FHWA

Principal Investigator
Edel Cortez

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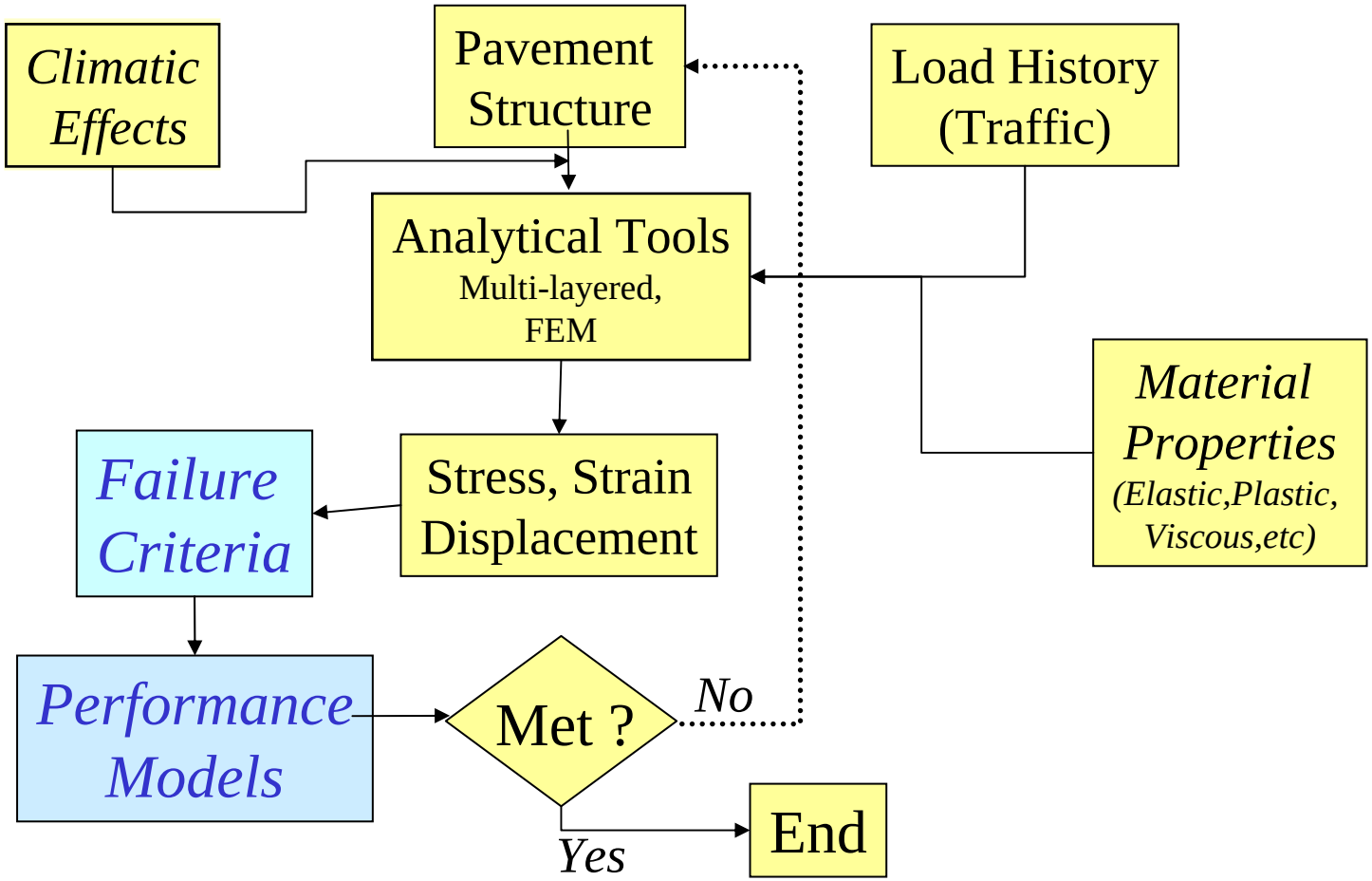
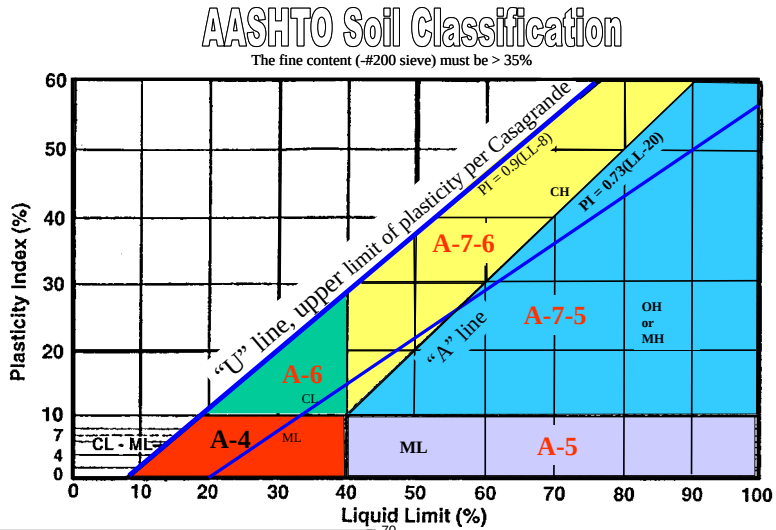
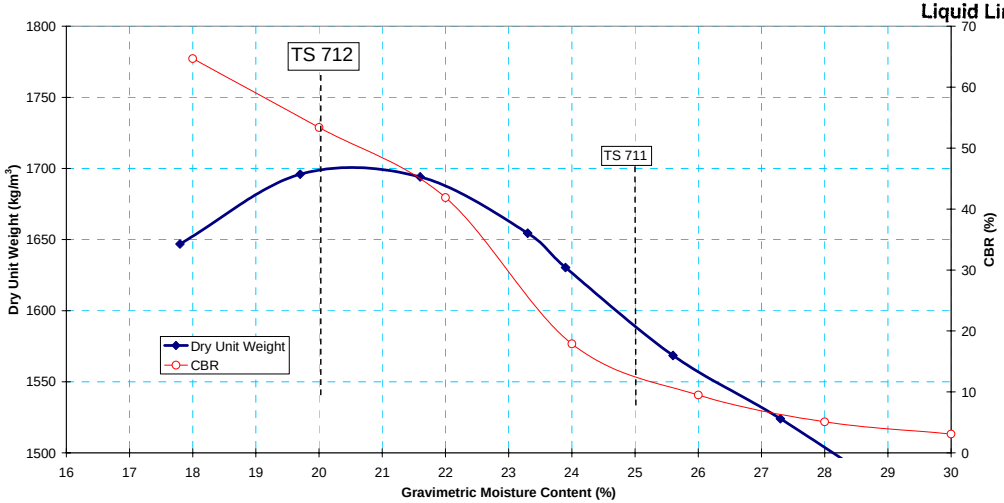
Mechanistic Design Process



Test Matrix

Subgrade Moisture Content	AASHTO Soil Type			
	A-2-4	A-4	A-6	A-7-5
M1	Optimum 10% TS-701	Optimum 17% TS-702	Optimum 16% TS-709	Optimum 20% TS-712
M2	12% TS-707	19% TS-704	**19% TS-708**	**21% TS-710**
M3	15% TS-703	23% TS-705	22% TS-706	25% TS-711





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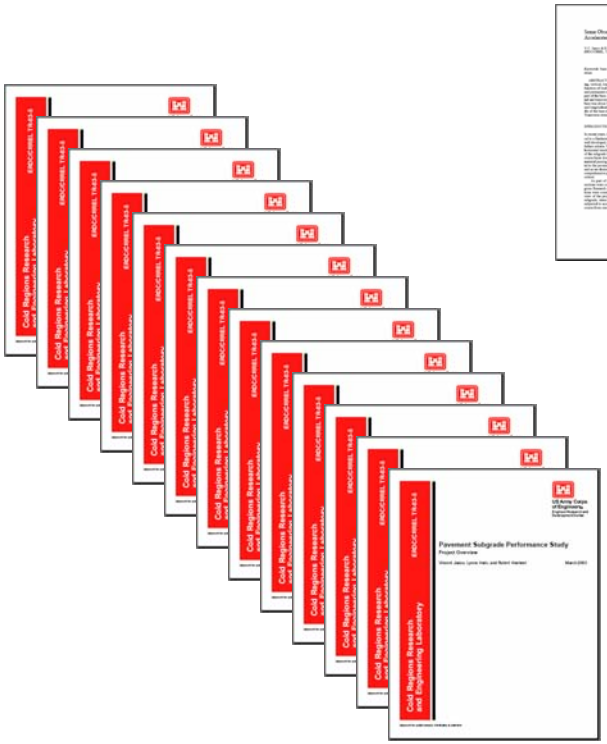
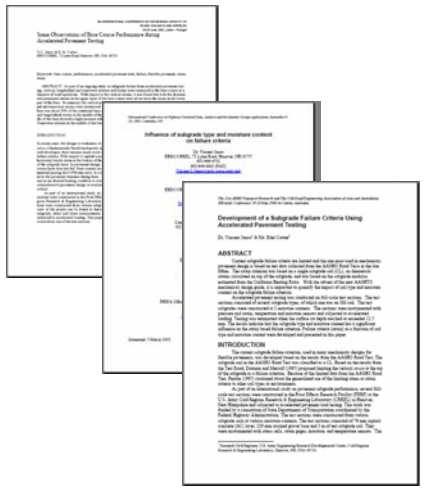
Full-scale test sections and APT

- Twelve full-scale test sections tested with CRREL's HVS.
- Each test sections has 6 test windows.
- Four subgrade soil types: A-2-4, A-4, A-6 and A-7-5
- Instrumented with temperature, moisture, stress and strain sensors.

Products



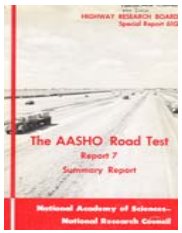


- Subgrade failure criteria
- Model development
- Database

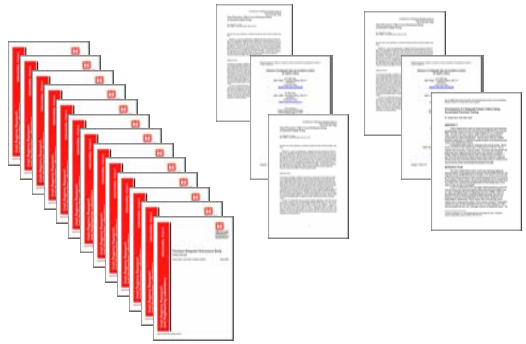
Guide for Mechanistic-Empirical Design
OF NEW AND REHABILITATED PAVEMENT STRUCTURES

Past, Present and Future

Old



- Generic failure criterion
- Based on elastic vertical strain on top of subgrade
- One place, one soil, mixed seasons, surface rut only.



New

- Failure criteria according to soil type and moisture based on elastic, plastic strains
- Improved subgrade models
- Under controlled moisture and temperature

Guide for Mechanistic-Empirical Design
OF NEW AND REHABILITATED PAVEMENT STRUCTURES

Future

- Base course failure criteria
- Improved base course models

Current Projects

1. Subgrade Performance Study

2. Geogrid Base Course Reinforcement

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Federal Highway Administration

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Transportation Research Board

AASHTO
American Association of State Highway and Transportation Officials

TPF Studies>>>Detailed View

Study Number:	TPF-5(010)
Status:	Cleared by FHWA
Title:	Structural Improvement of Flexible Pavements Using Geosynthetics for Base Course Reinforcements
Lead Agency:	Maine Department of Transportation 16 Statehouse Station Augusta, ME Phone: 207- 287-2551
Lead Agency Contact:	Dale Peabody (Dale.Peabody@state.me.us) Phone: 207- 624-3305 Fax: 207-624-3301
FHWA Technical Liaison:	Ewa Flom (Ewa.Flom@fhwa.dot.gov) Phone: 202-366-2169 Fax: 202-493-2070 FHWA Routing Symbol: HIPT-10
Contractor:	Cold Region Research and Engineering Laboratory
Investigator:	Karen Henry (karen.s.henry@erdc.usace.army.mil) Phone: 603-646-4188 Fax: 603-646-4640
Study Partners:	CT, GA, IA, ID, KS, ME, MS, NY, OH, TX, WA
Contract Amount:	$0
Commitments Received:	$595,000
100% SP&R Approval:	Approved
Objectives:	To determine whether geosynthetics (geogrids and geotextiles) can be used to increase the structural capacity of pavements typically constructed by state DOTs. To measure in situ stress/strain response of the reinforced material for use in current or future pavement design processes. To determine whether geosynthetics can be used to increase the service life of pavements typically constructed by state DOTs. To compare the

Project Objectives

Can this solve this?
Quantitative cost-benefit ratio?

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Past Projects

1. Variable Tire Pressure Effects
2. Expedient Soil Stabilization
3. Reinstatement of Utility Cuts

Future Projects

1. Base Course Performance

2. Validation of the AASHTO Mechanistic-Empirical Design Method

3. Reinstatement of Utility Cuts

4. Your ideas

Thank you