Pavement Materials Research Update

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Heavy Vehicle Simulator (HVS)

HVS Track

Located in Gainesville, FL

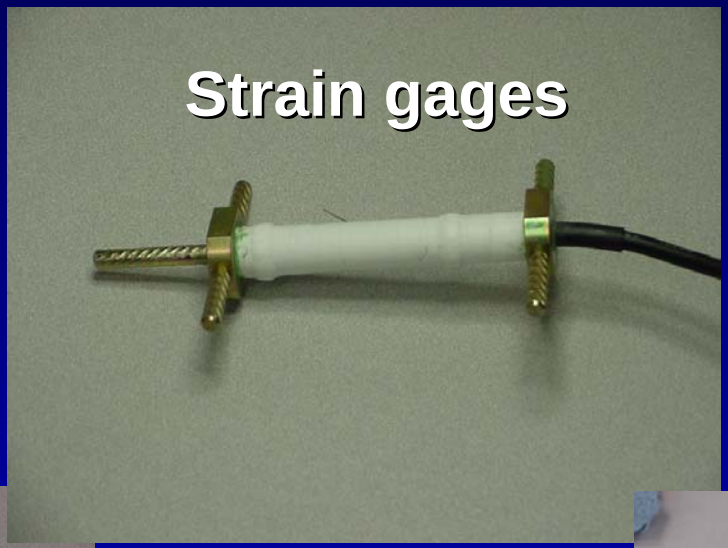
HVS Loading

- 9 kip Load
- One direction
- 8 mph
- Super single tire
- Up to 14,000 passes a day

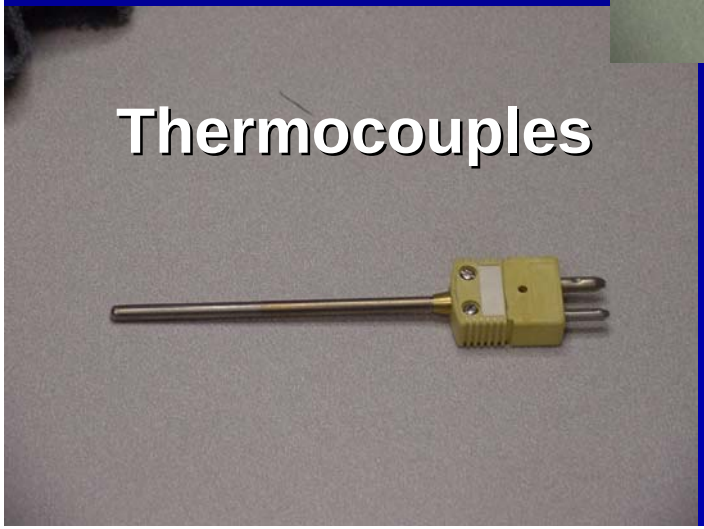
All asphalt rutting sections are tested at 50° C

HVS Instrumentation

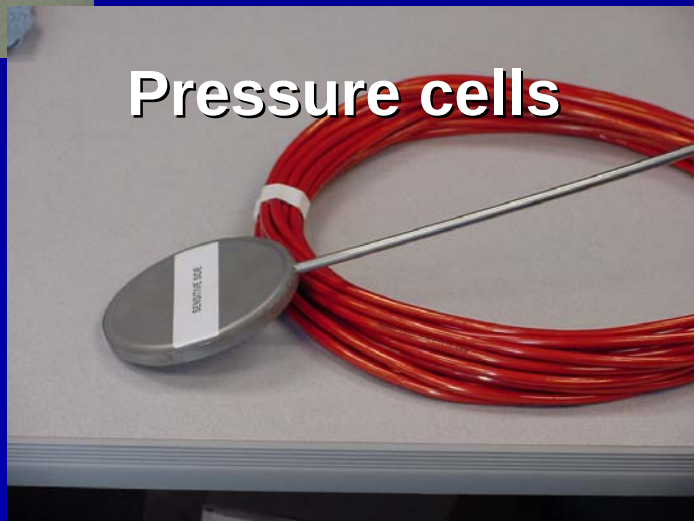
Strain gages



Thermocouples

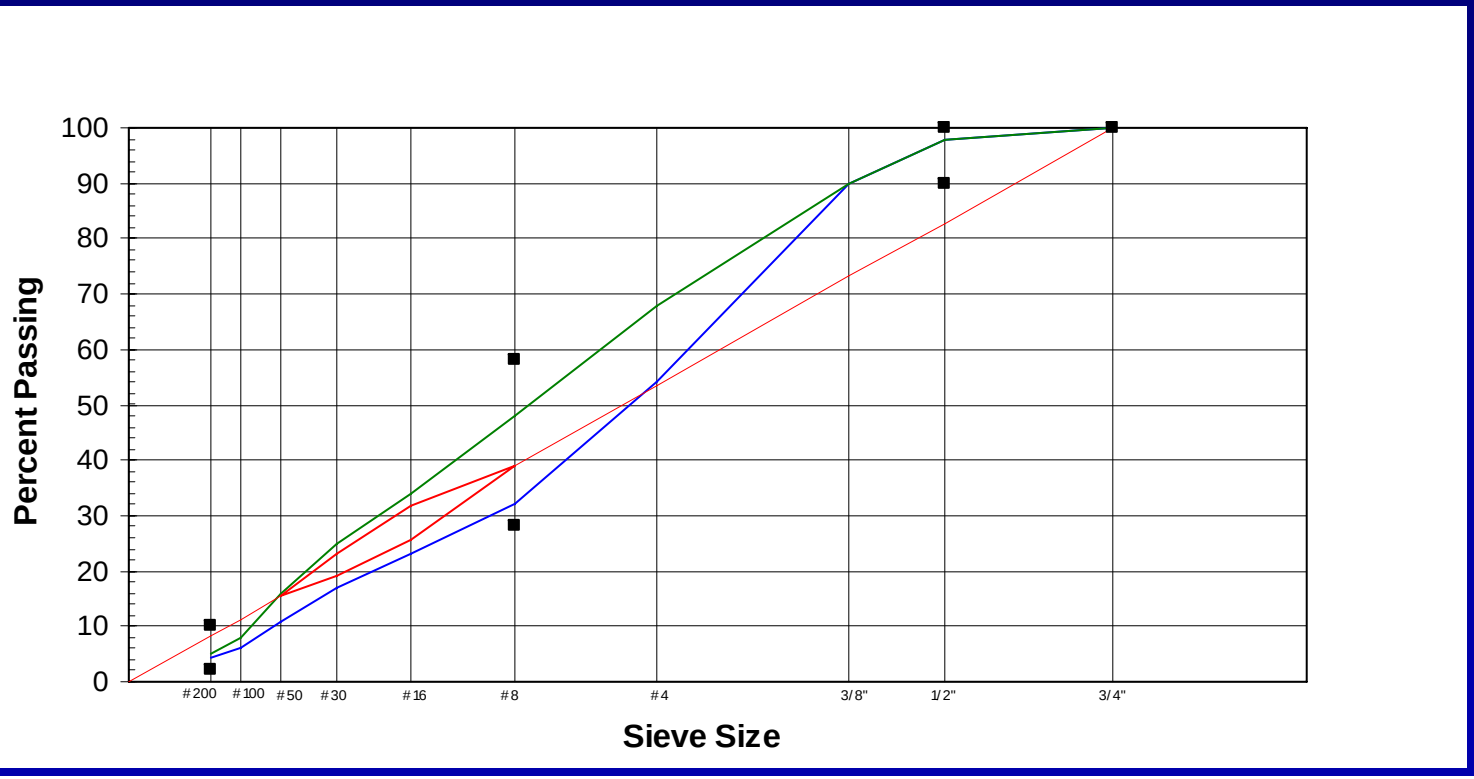


Pressure cells



Heavy Vehicle Simulator

- **Round #3**
  - Testing completed last fall.
  - 12.5 mm coarse mix vs. fine mix (both are traffic level D mixes).
  - Georgia granite and local sand.
  - PG 67-22.



HVS Round #3 Results

- Twelve sections tested.
  - 6 fine graded & 6 coarse graded.
  - 90,000 passes for each section.
  - Coarse section rut average = 15.1 mm.
  - Fine section rut average = 12.7 mm.

HVS Accelerated Pavement Aging System

- 85 degrees C.
- Should accelerate binder hardening in the pavement.
- Goal is to use the HVS to crack the asphalt.
- Current UF Research Project.

NCAT Test Track

www.pavetrack.com

NCAT Test Track

- Round #2:
  - FDOT left two sections from round #1 in place for another 10 million ESALs of traffic (2-years).
  - 12.5 coarse vs. fine (unmodified binder, PG 67-22).
  - 20 million ESALs applied.
    - Fine-graded mix rut depth = 3.1 mm.
    - Coarse-graded mix rut depth = 3.4 mm.

Fine-graded Mix

Section S6

Coarse-graded Mix

Section S7

NCAT Test Track Round # 2 (cont.)

- Constructed two new sections of 12.5 mm fine graded mix; PG 67-22 & PG 76-22 to match Gainesville HVS test sections (round #1).

VS.

- 10 million ESALs applied.
  - Unmodified mix rut depth = 6.5 mm.
  - Modified mix rut depth = 2.9 mm.

Sections E2 & E3

Fine mix with PG 67-22 & PG 76-22

NCAT Test Track
Round #3 Plan

- Construct two new mixtures
  - One with a high energy ratio (good cracking resistance).
  - One with a low energy ratio (poor cracking resistance).
- Use Florida limerock base.
  - Base material will be trucked to NCAT for construction.

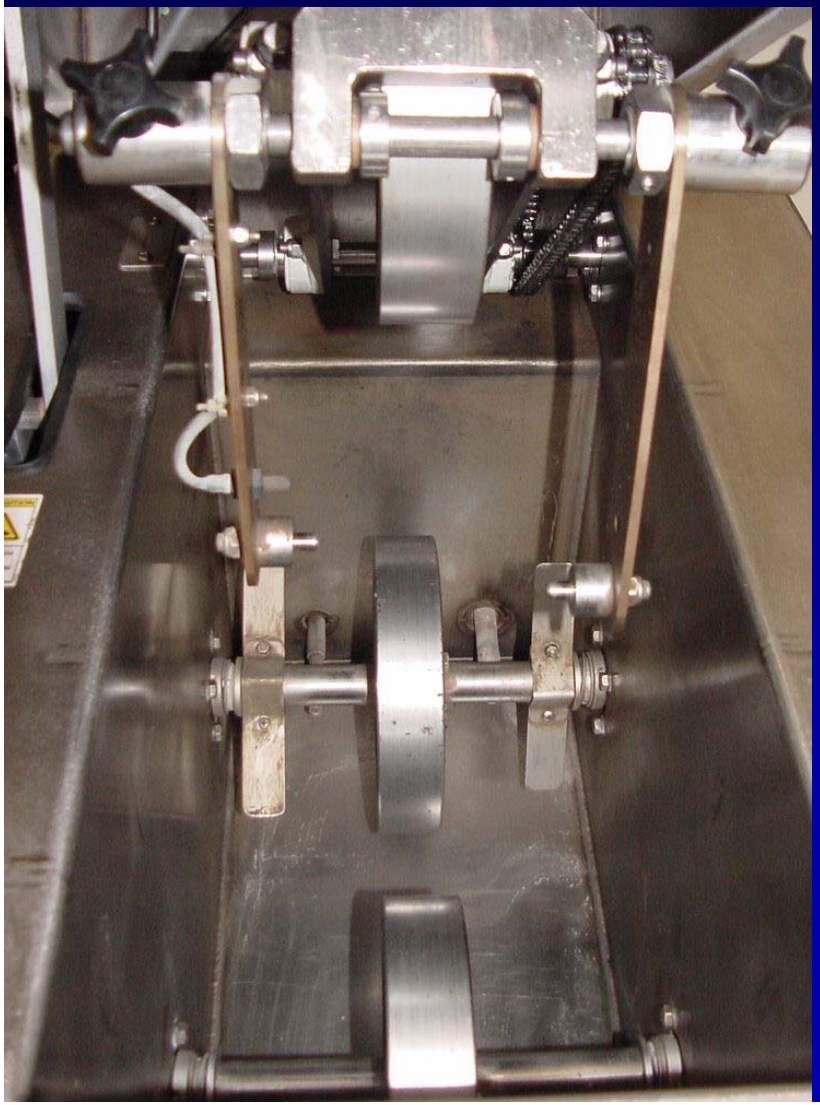
Asphalt Pavement Analyzer

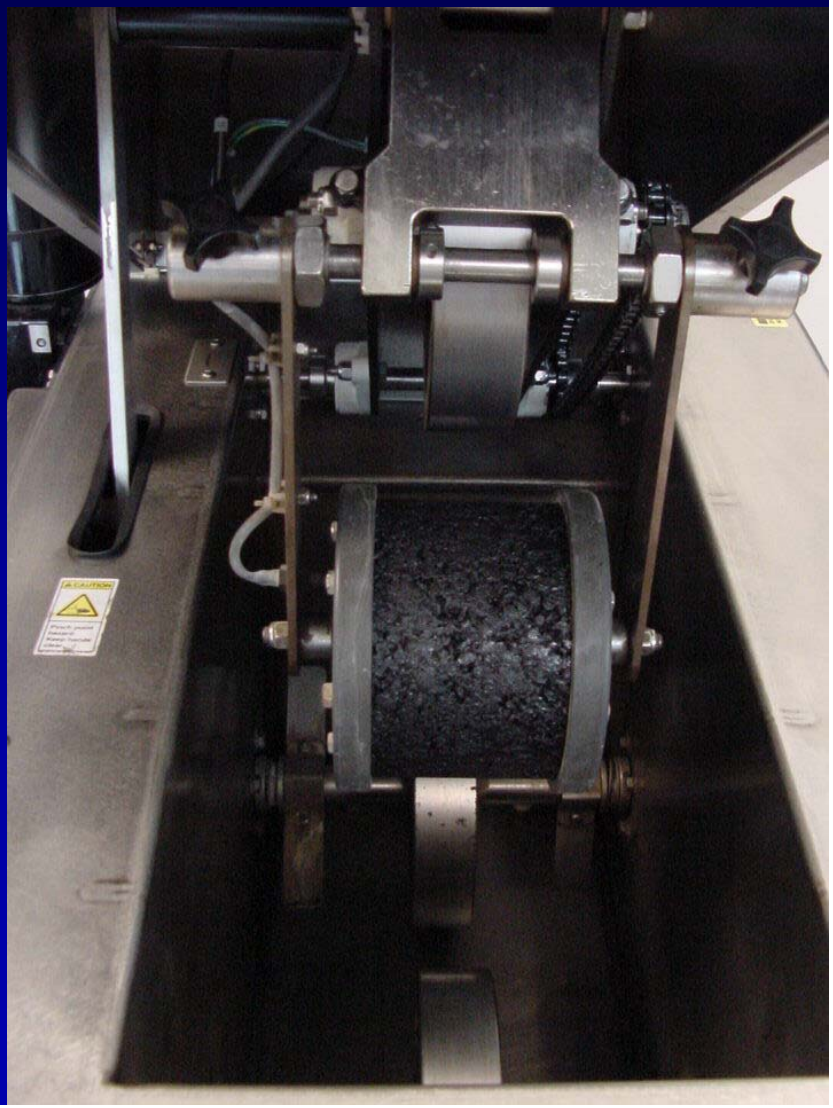
- Predominant laboratory rutting performance test in the U.S.
- Currently used by FDOT for:
  - Research.
  - Mix design verification of traffic level D & E fine graded mixtures.
  - Production testing (trial basis).
    - I-295 in Jacksonville.

Rotary Asphalt Wheel Tester

- Developed by Pine Instruments.
- Evaluating it in the Research Lab.
- Tests a SGC pill under water.
- Ruts the curved surface of the specimen.

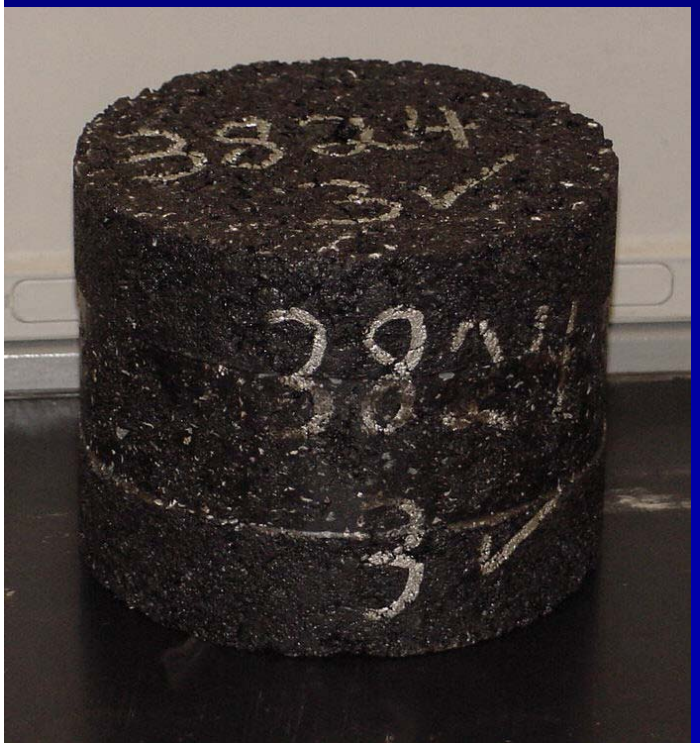
Inside Views





Rotary Asphalt Wheel Testing

- Water temperature can be set up to 60 degrees C.
- Test can be extreme.
- Still evaluating testing parameters.
- Potential as a rutting and / or possibly a stripping test.



RAP Study

- Evaluate the effect of increased RAP on mixture performance in the lab.
- Varying percentages of RAP
- Laboratory Tests
  - APA
  - UF IDT (cracking)
  - Rotary wheel testing
  - Binder tests
- Fractionated RAP

Fractionated RAP

Segregation Study

- Comparing lab performance of segregated areas to uniform sections.
  - APA and UF IDT cracking test.
- Performance is controlled by the amount of coarse aggregate present not the level of segregation.

Core Dryer

- Able to adequately dry cores in about 15 minutes without damaging them.
- Can decrease density testing time.
- Density cores currently have to be dried for a minimum of four hours and preferably overnight.

Friction Test Sections

- FC-12.5 (dense graded friction course)
  - SR 121
  - SR 16
- FC-5 (OGFC)
  - SR 24
  - US 27

Hot-in-place Recycling

No Track Tack Coats

- Two new products.
- Results are mostly good.
  - Several good field jobs, one bad job
  - Trouble meeting lab specs
- Working on generic specification.

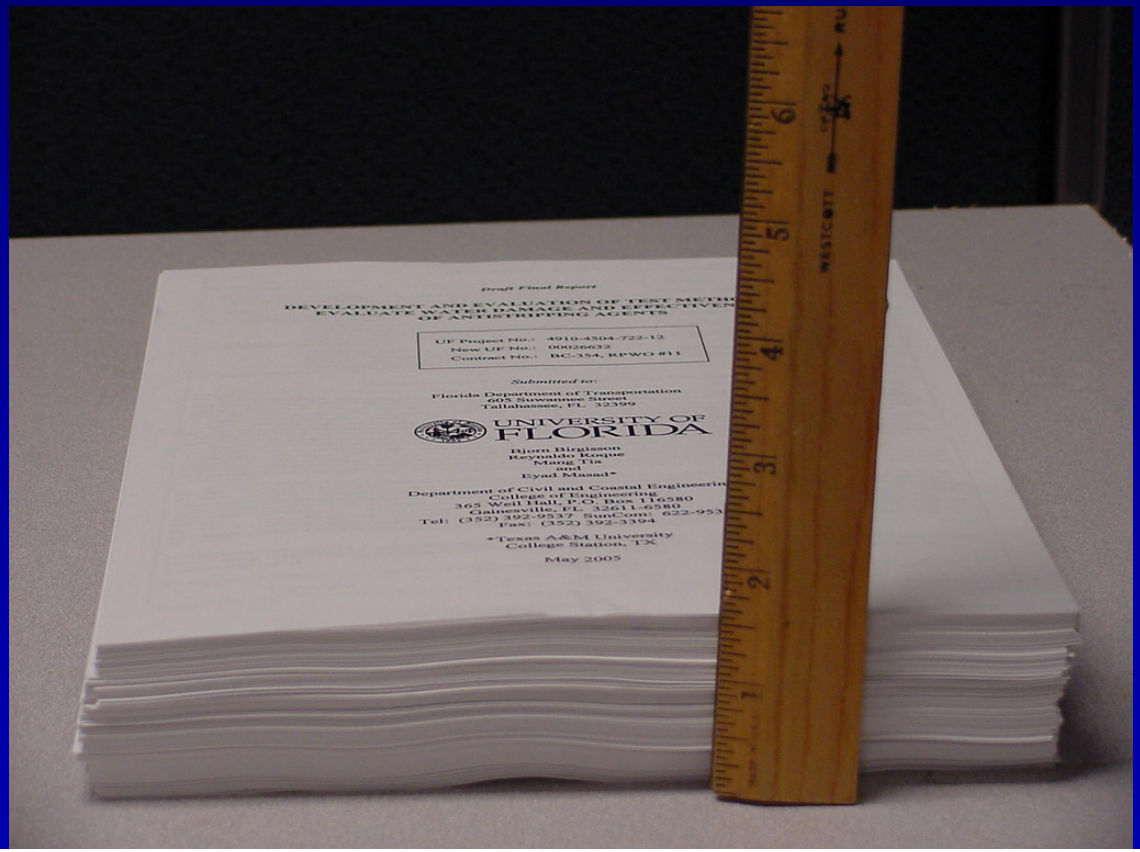
University and Contract Research

- New techniques for determining the adequacy of an asphalt mixture gradation.
- Simple IDT machine for cracking test.
- Evaluation of thick and bonded OGFC.
- OGFC's contribution to cracking resistance in asphalt mixtures.
- Implementation and calibration of mechanistic-empirical design guide.
- Development of a construction quality index.

FDOT Research Reports

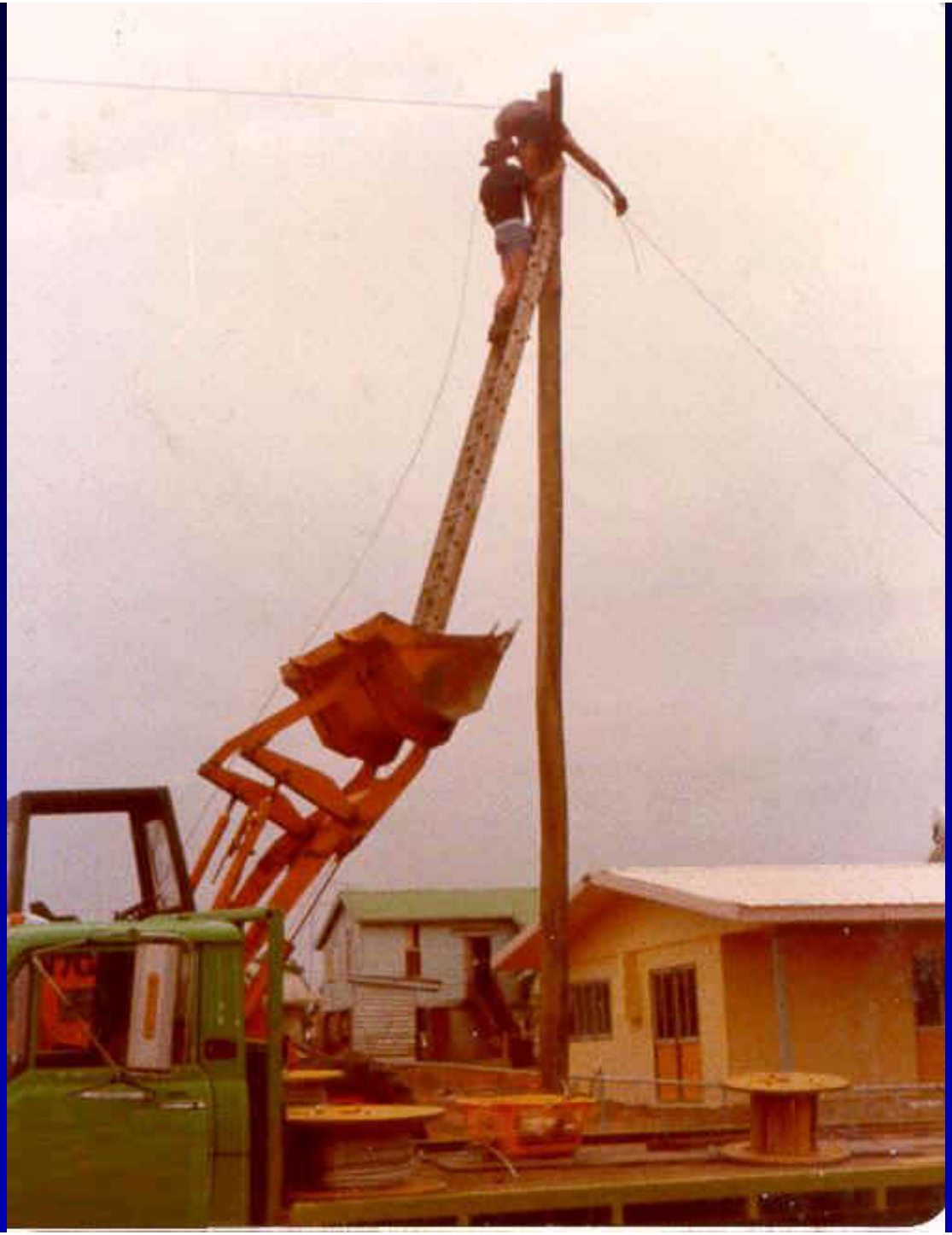
- Available on the internet.

http://www.dot.state.fl.us/statematerialsoffice/



Safety Research


TOYOTA
KOMATSU
PATRIA 50



Thank You!
Questions or Comments?

2006 National Champs