

ASSESSING APPROPRIATE LOADING CONFIGURATION IN APT

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APT?

- ⇒ Controlled application of realistic wheel loading
- ⇒ Allows monitoring the performance of pavement systems within short time
- ⇒ Eliminates/reduces the need for in-service experimental sections

APT ADVANTAGES

- ⇒ Time
- ⇒ Control of Variables
- ⇒ Economy and Flexibility



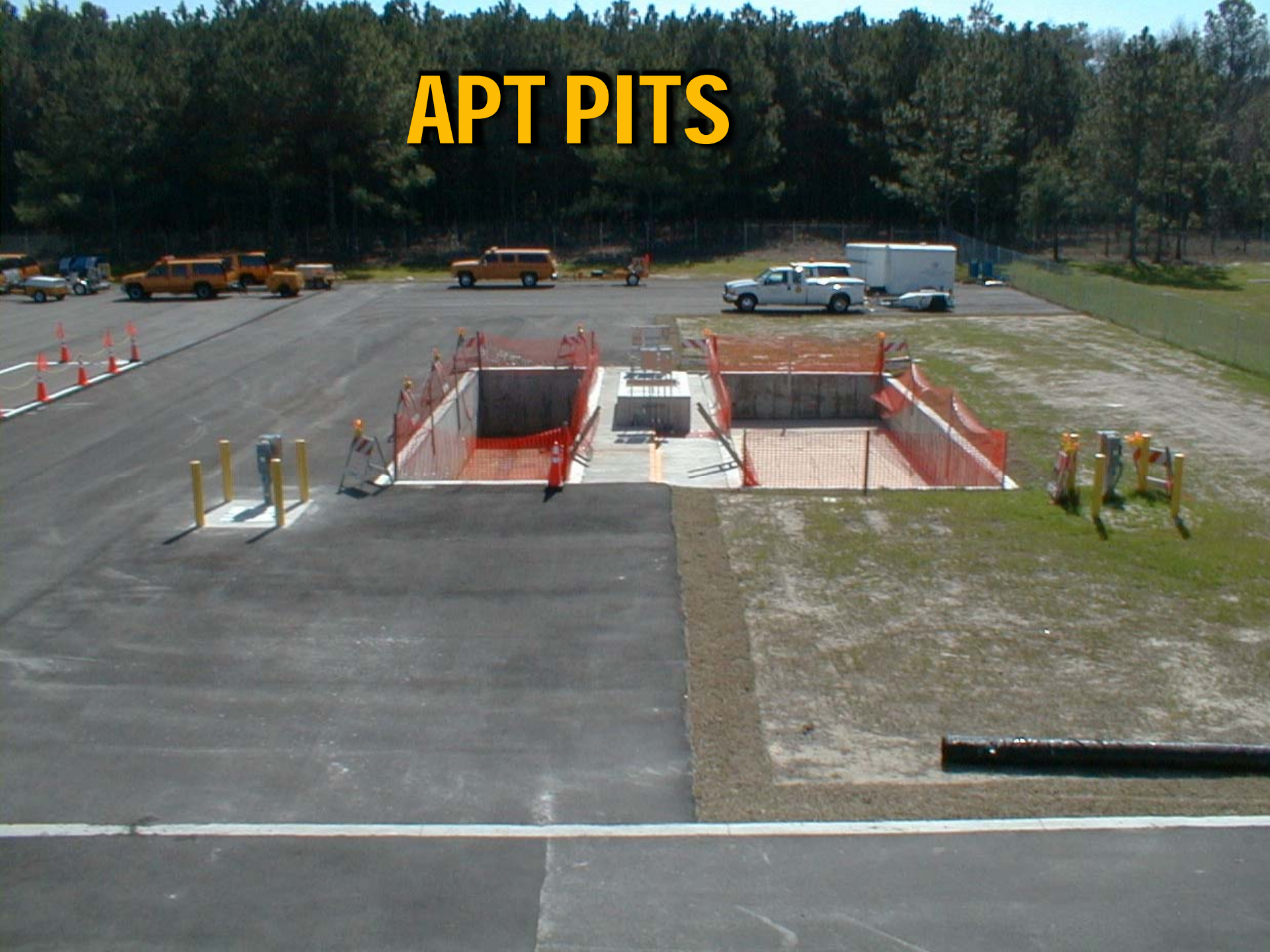
FLORIDA'S APT PROGRAM

- ⇒ Housed within State Materials Research Park
- ⇒ Test site consists of 8 linear tracks 150x12 ft.
- ⇒ 2 additional tracks with water table control capability
- ⇒ Loading using a Heavy Vehicle Simulator (HVS)

APT SITE



APT PITS



HVS



Weight: 50+
tons

Length: 75 feet

Height: 13 feet

Width: 12 feet

LOADING CAPABILITIES

- Loading: 7 to 45 kips
- Wheel speed: 8 mph
- Sinusoidal loading
- Maximum passes/day
 - 29,000 bi-directional
 - 14,000 uni-directional



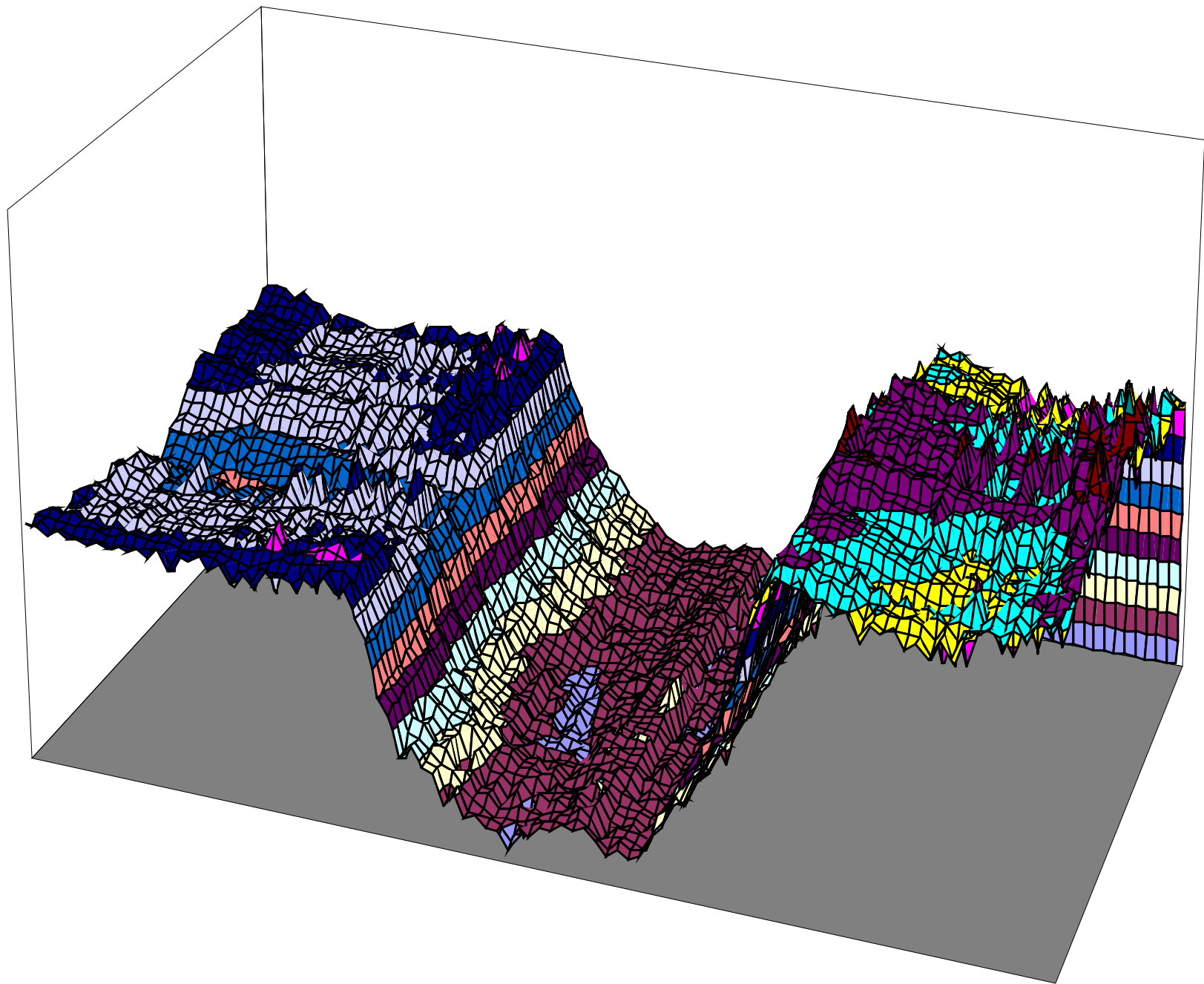
TESTING CAPABILITIES

- Test Track Length: 20'
- Wander From 0 – 30"
- Super-Single vs. Dual
- Maximum Rut Depth: 4"





LASER PROFILING



ENVIRONMENTAL CHAMBER

- ⇒ 2" thick Styrofoam w/ aluminum sheeting
- ⇒ Windows & doors provided
- ⇒ Easily removable

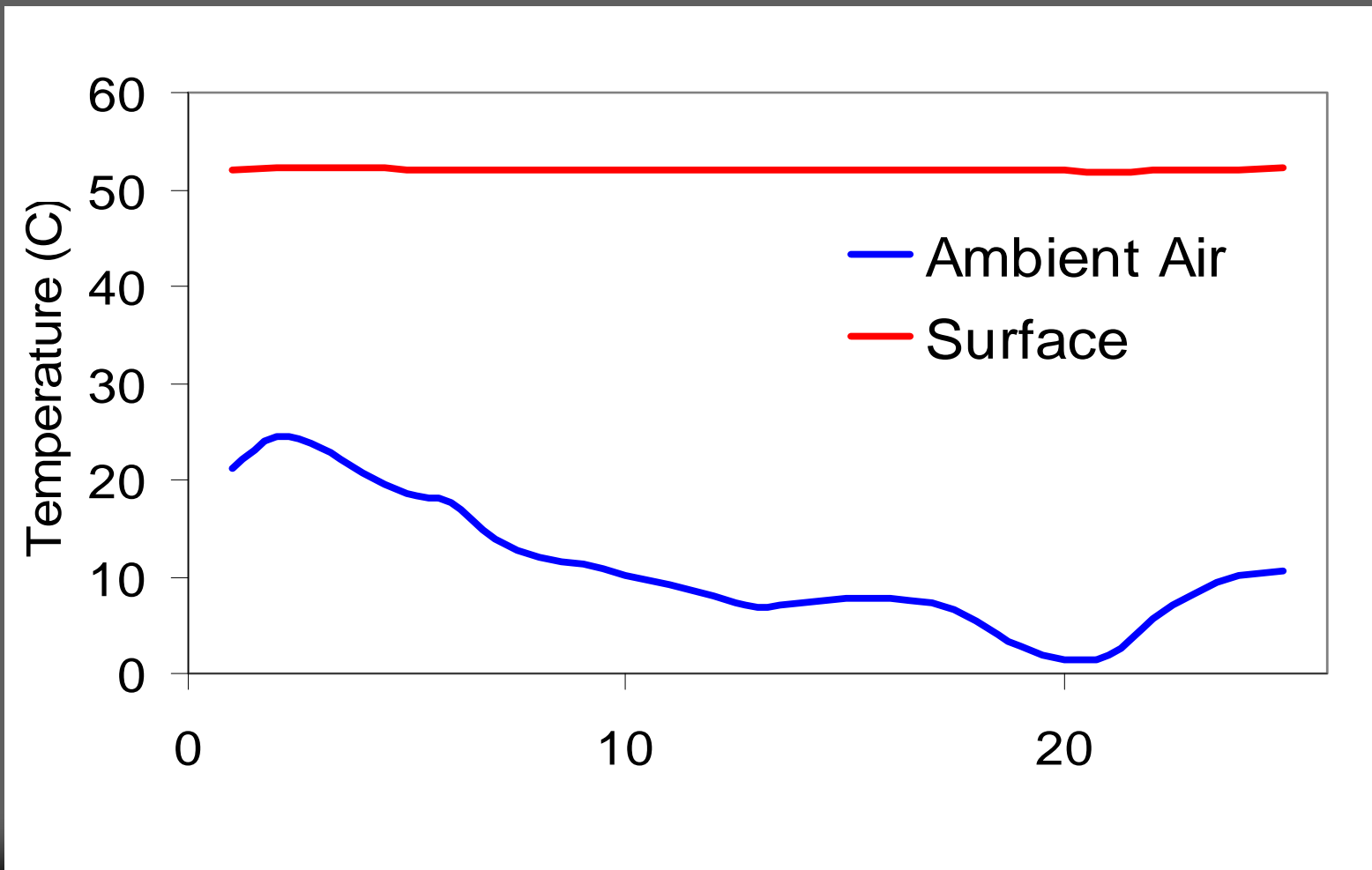


HEATING SYSTEM

- ⇒ 6 elements, 9 ft long, attached to HVS test beam & moving transversely with beam.
- ⇒ Independently controlled to provide 6 heating zones.



SYSTEM PERFORMANCE



Rutting



INITIAL EXPERIMENT

Rutting



INITIAL EXPERIMENT



SBS modifier

Binders:

PG 67-22

PG 76-22

SP 12.5 fine graded
mixes

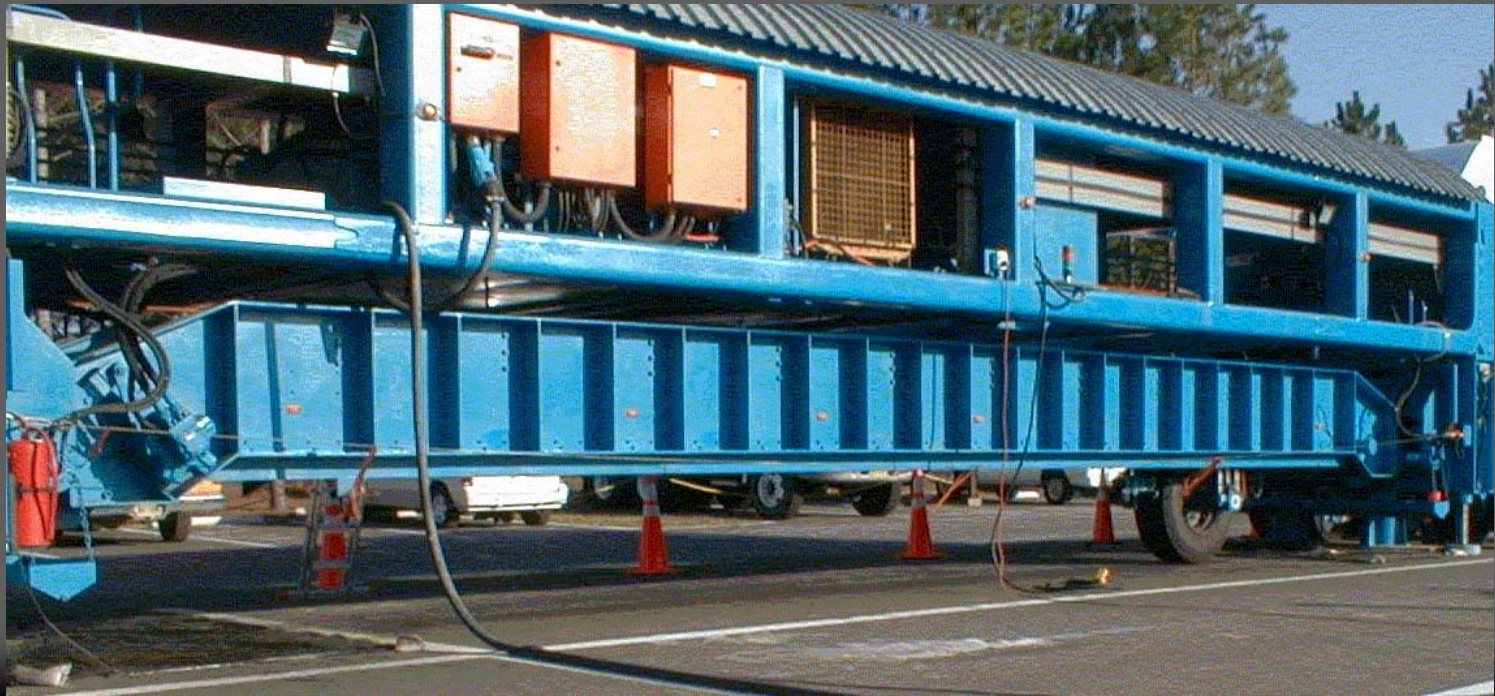


***LOADING
CONFIGURATION
ASSESSMENT***

UNI-DIRECTIONAL LOADING



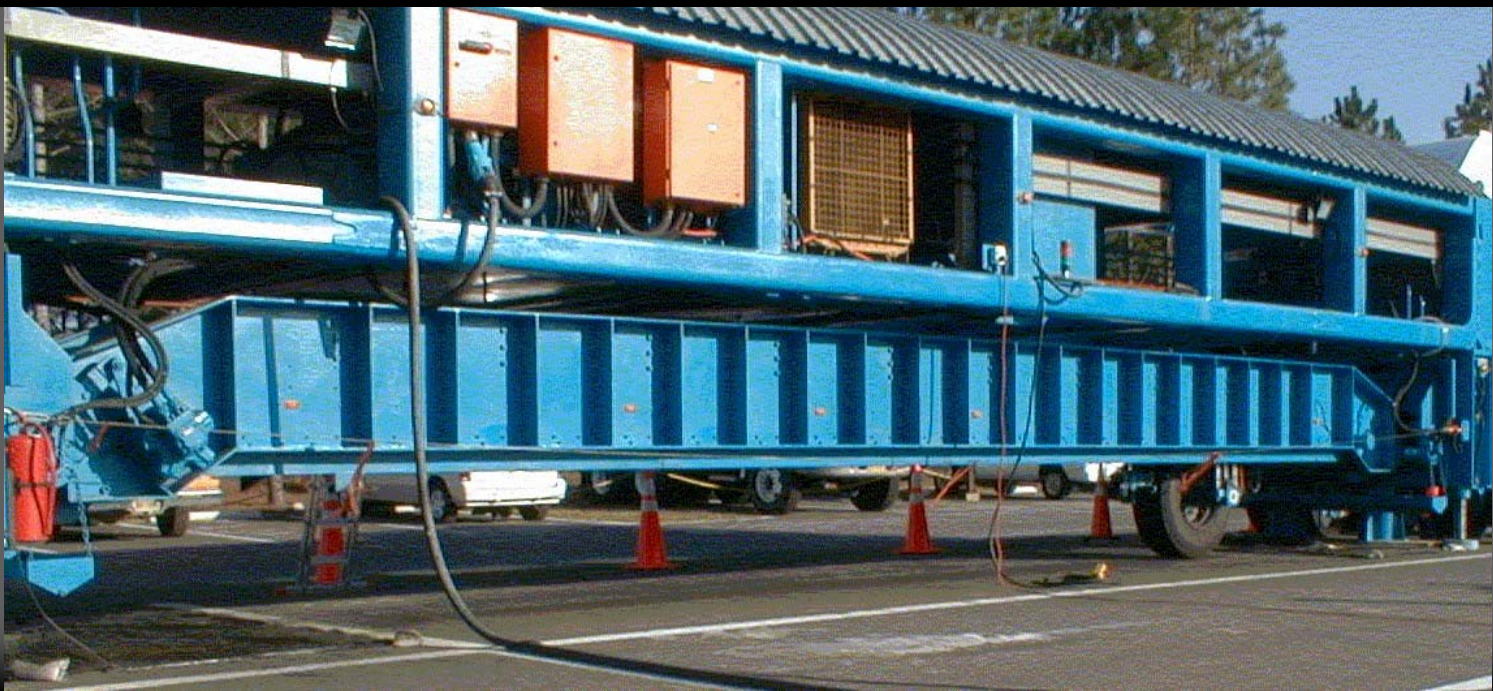
BI-DIRECTIONAL LOADING



UNI-DIRECTIONAL w/ WANDER



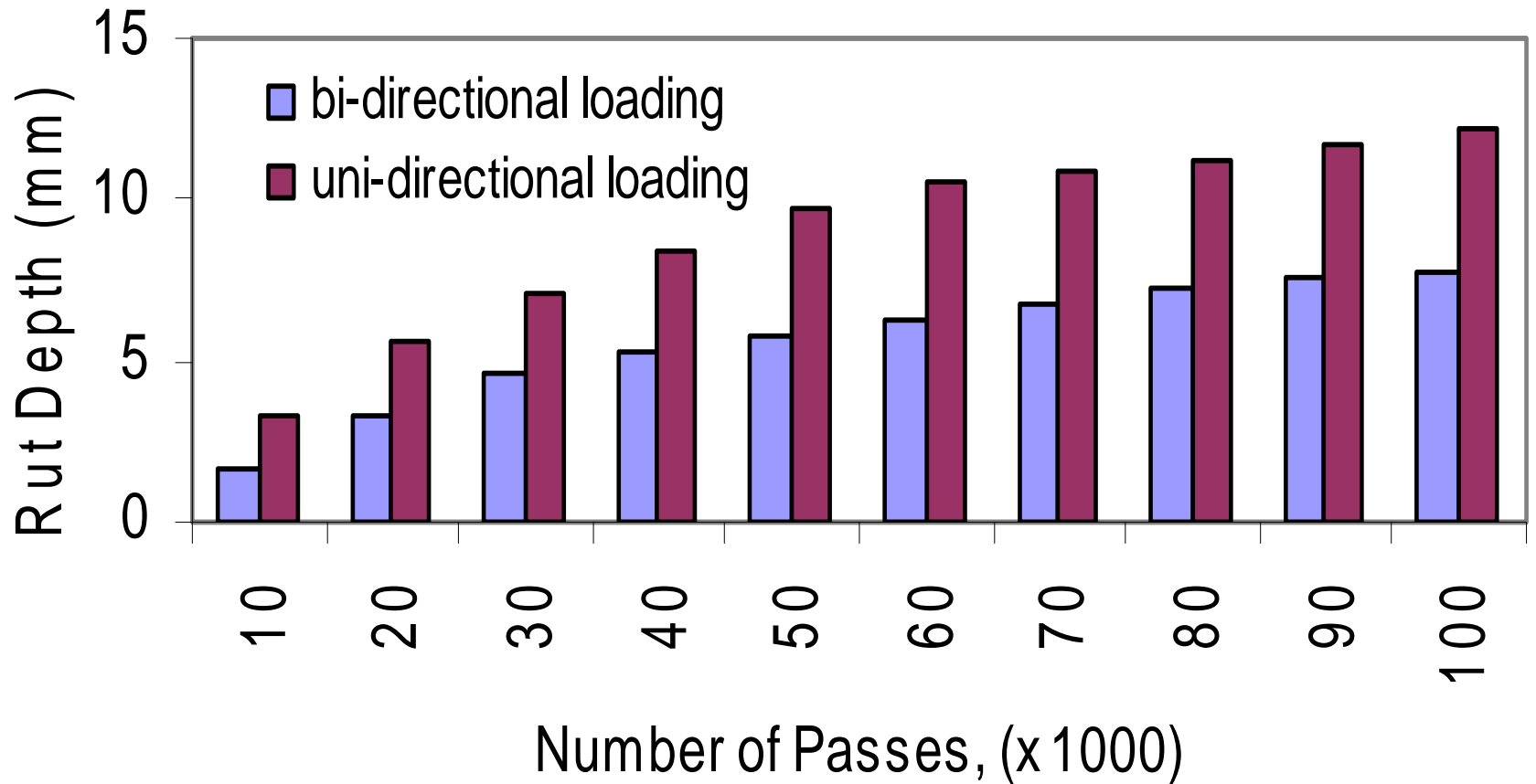
BI-DIRECTIONAL w/ WANDER



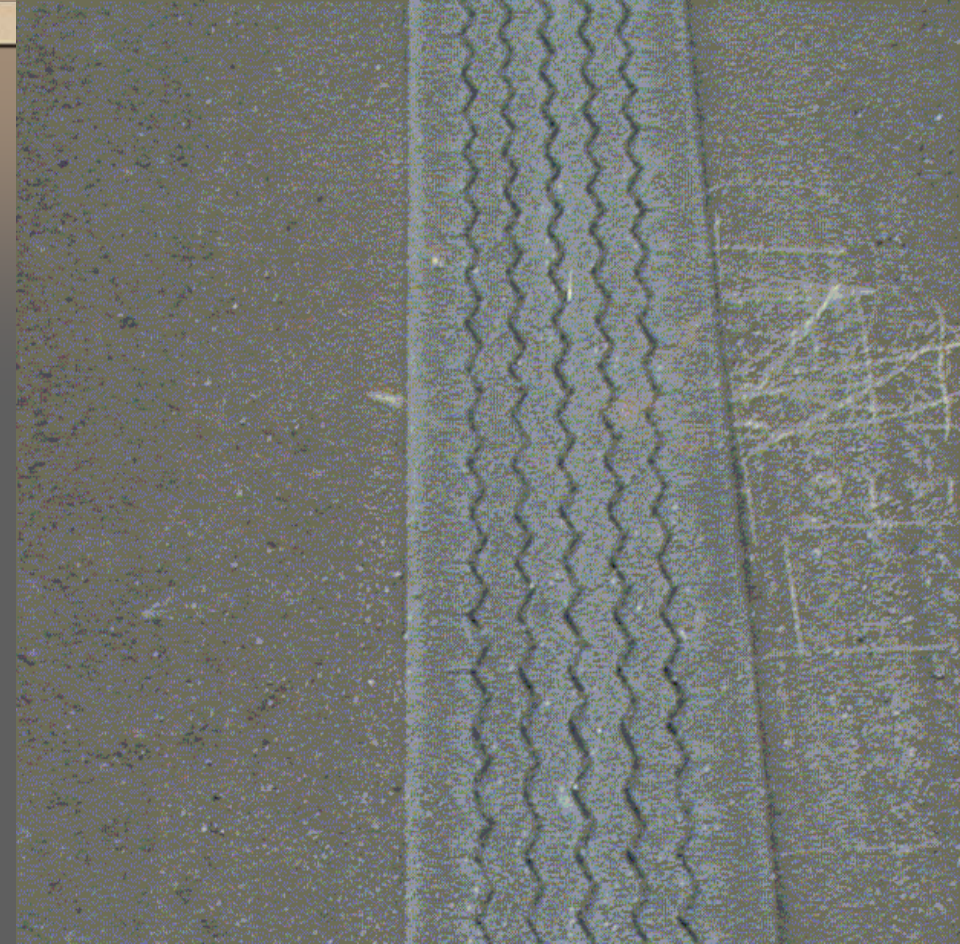
LOADING CONFIGURATION ASSESSMENT

- ⇒ Good Year G165 super-single tire
- ⇒ Tire load of 9000 lbs
- ⇒ Test speed of 8 mph
- ⇒ Tire pressure of 112 psi

RUT DEPTH – NO WANDER



RUT ILLUSTRATIONS

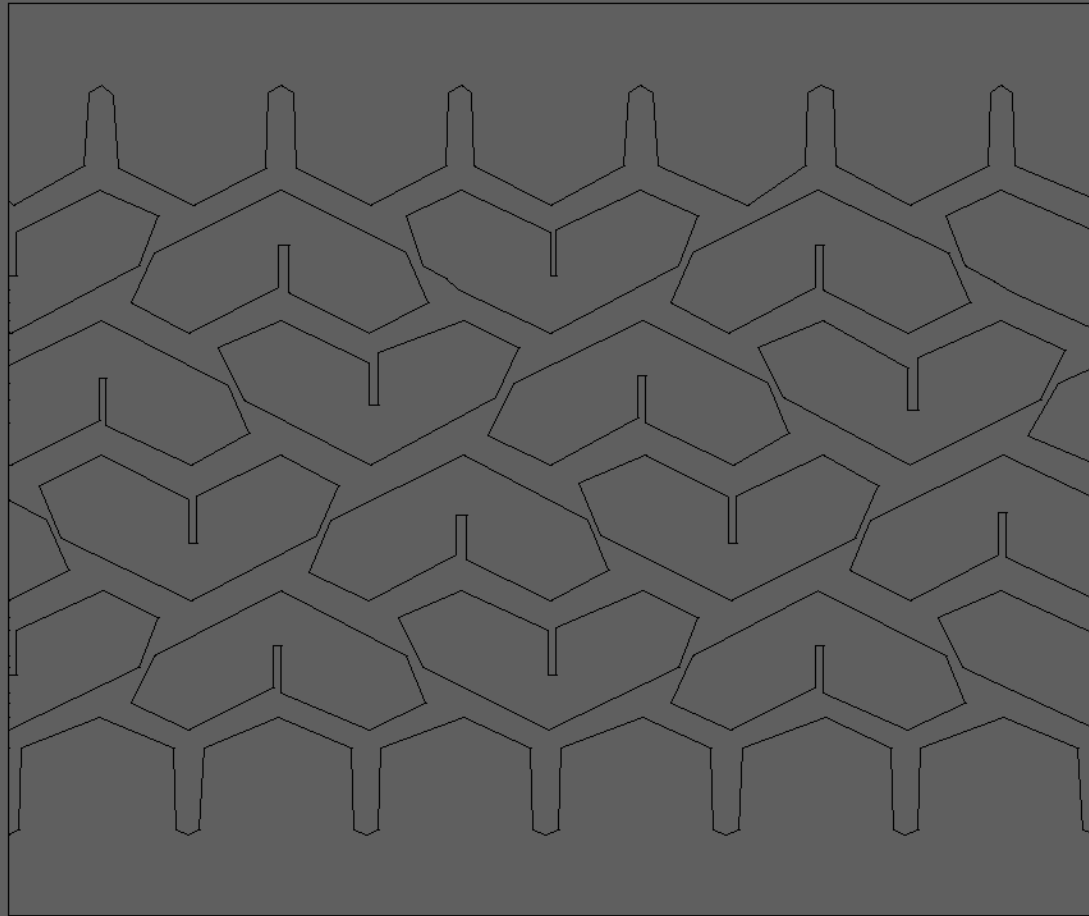


- ⇒ Bi-Directional, No Wander (above)
- ⇒ Uni-Directional, No Wander (Left)

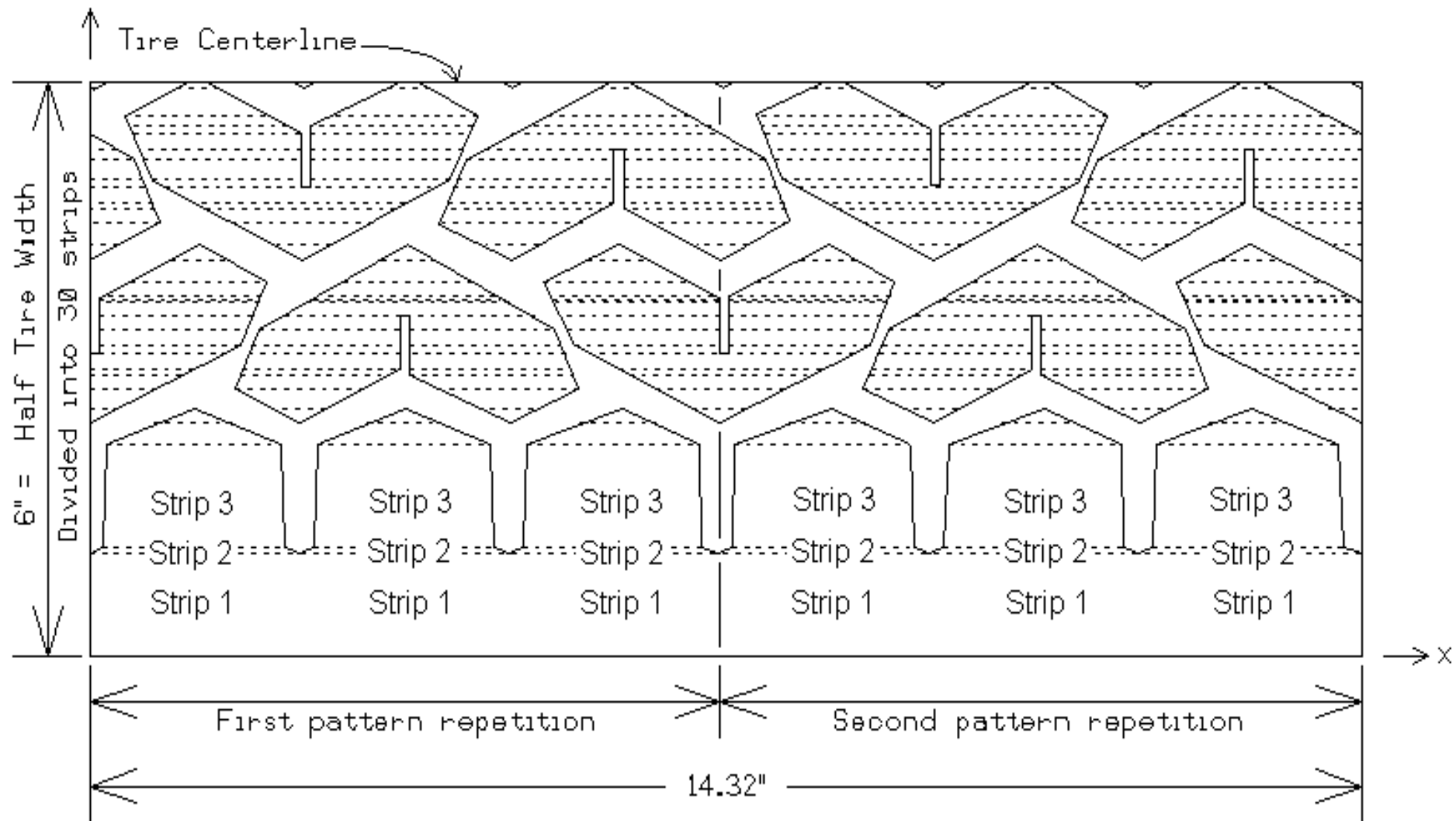
RUBBER BUILD-UP



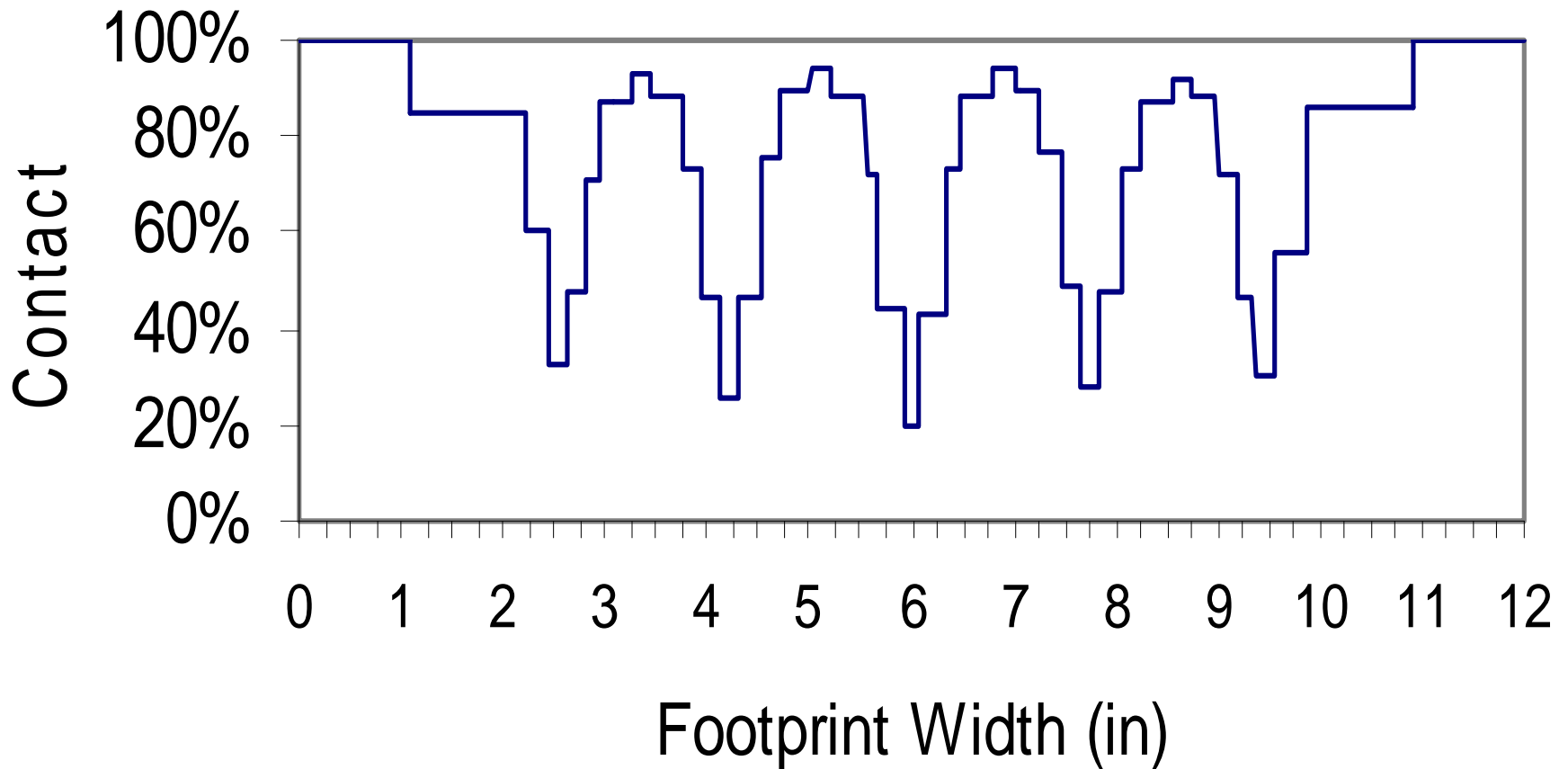
TIRE TREAD PATTERN



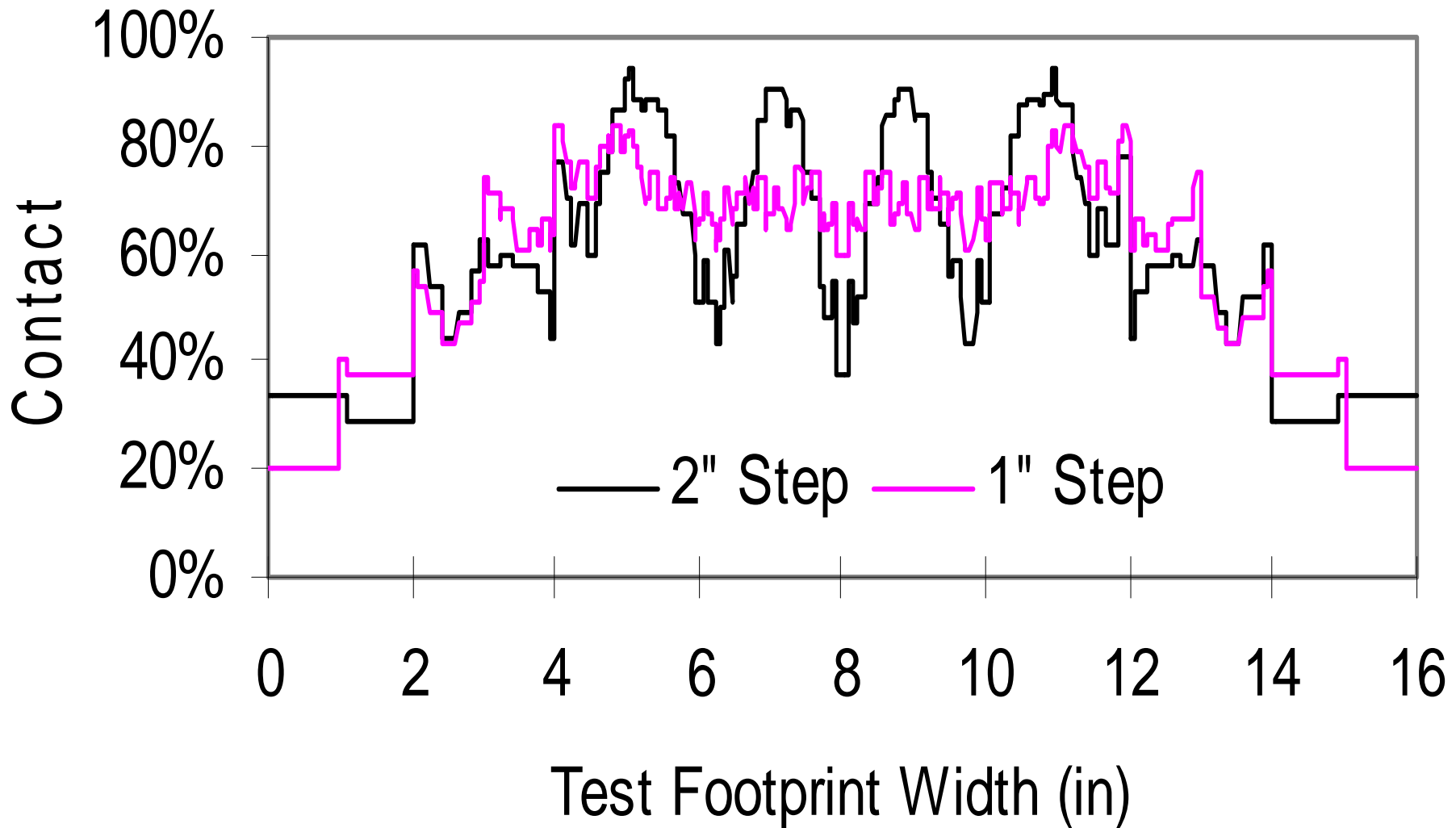
TIRE TREAD STRIPS



% TIRE CONTACT



% CONTACT - 2" VS. 1" STEPS



CONCLUSIONS

- ⇒ W/o wander, uni-directional - rut developed at rate of 65% greater per-pass basis.
- ⇒ W/o wander, uni-directional mode placed considerable wearing forces. As much as 25% of tread depth worn away at very localized locations.
- ⇒ Uni-directional loading, pattern matched very closely the general tire tread pattern.

CONCLUSIONS (Con't)

- ⇒ W/ wheel wander, wander increments differently affected the tire-pavement contact.
- ⇒ Importance of using both wheel wander & appropriate wander incremental step.
- ⇒ It is recommended that, in order to determine an appropriate loading configuration, a thorough pavement-tire tread investigation be conducted any time the tire brand and/or type is changed.

WEBSITE LINKS

⇒ [http://www11.myflorida.com/statematerialsoffice/
PavementEvaluation/APT/aptresearch.htm](http://www11.myflorida.com/statematerialsoffice/PavementEvaluation/APT/aptresearch.htm)

Questions???

