

Development and Validation of a New Design Procedure for the Design of Airfield Flexible Pavements using a Stress-Based Approach

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Scope of Proposed Research

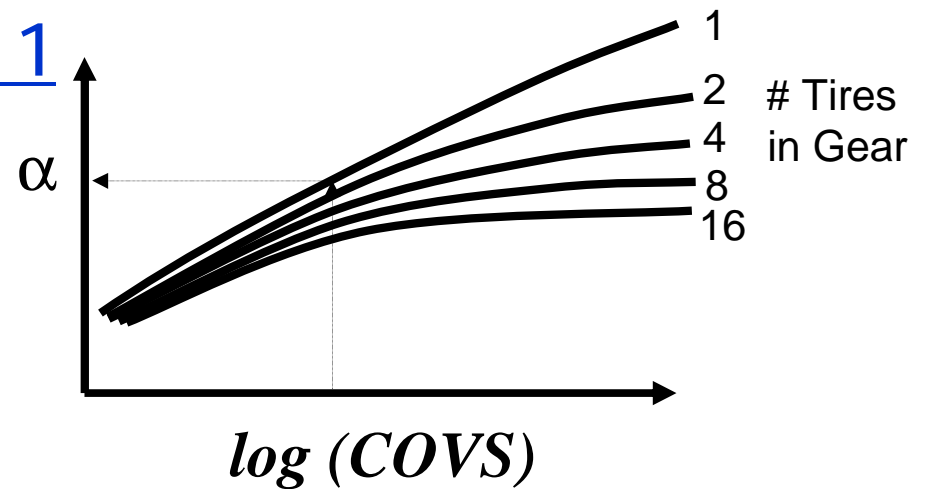
- Re-examine existing full-scale performance data and tailor performance data to existing formulation
- Complete the redevelopment of the CBR procedure in terms of the new stress-based CBR criteria
- Validation the stress distribution within flexible pavements
- Validation of *b*-criteria
- Develop numerical models and software to incorporate into a system for the design of flexible pavement using the new CBR procedure

Current Implementation of CBR Design Procedure for Military Airfields

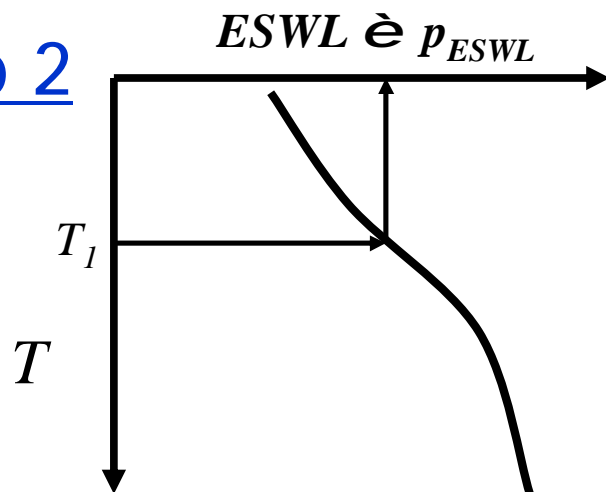
Classic CBR Equation

$$t = a \cdot \sqrt{\frac{ESWL}{8.1 \cdot CBR} - \frac{A}{p}}$$

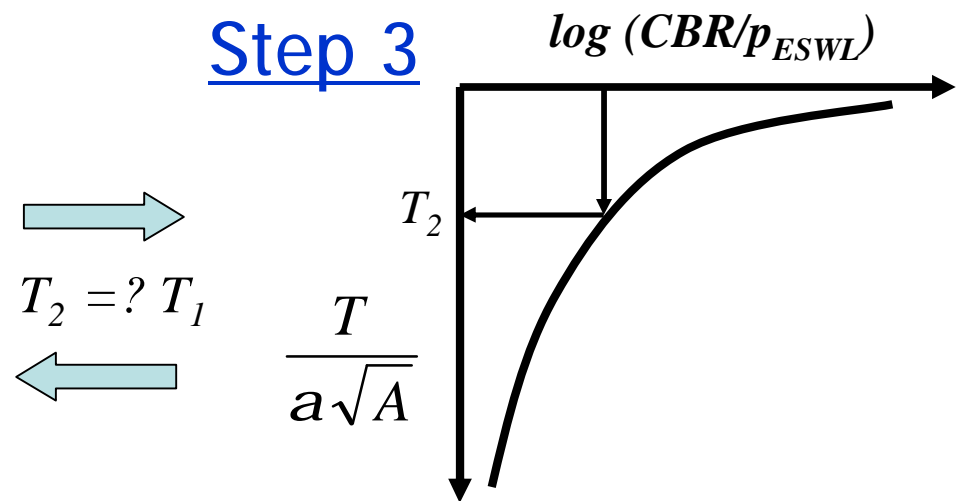
Step 1



Step 2

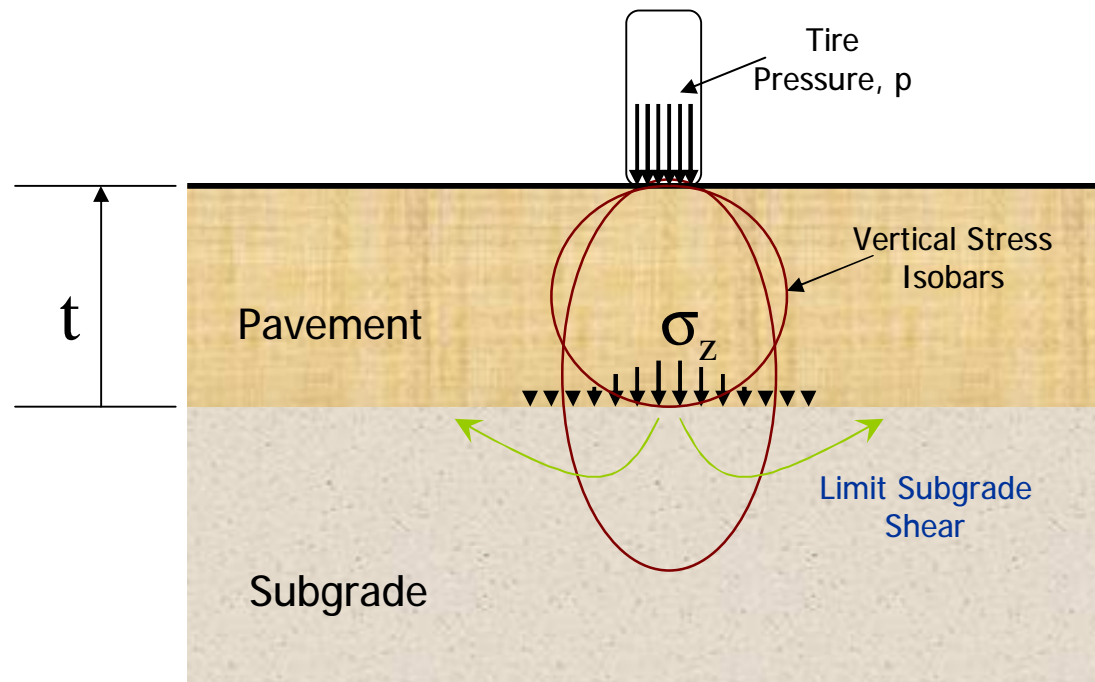


Step 3

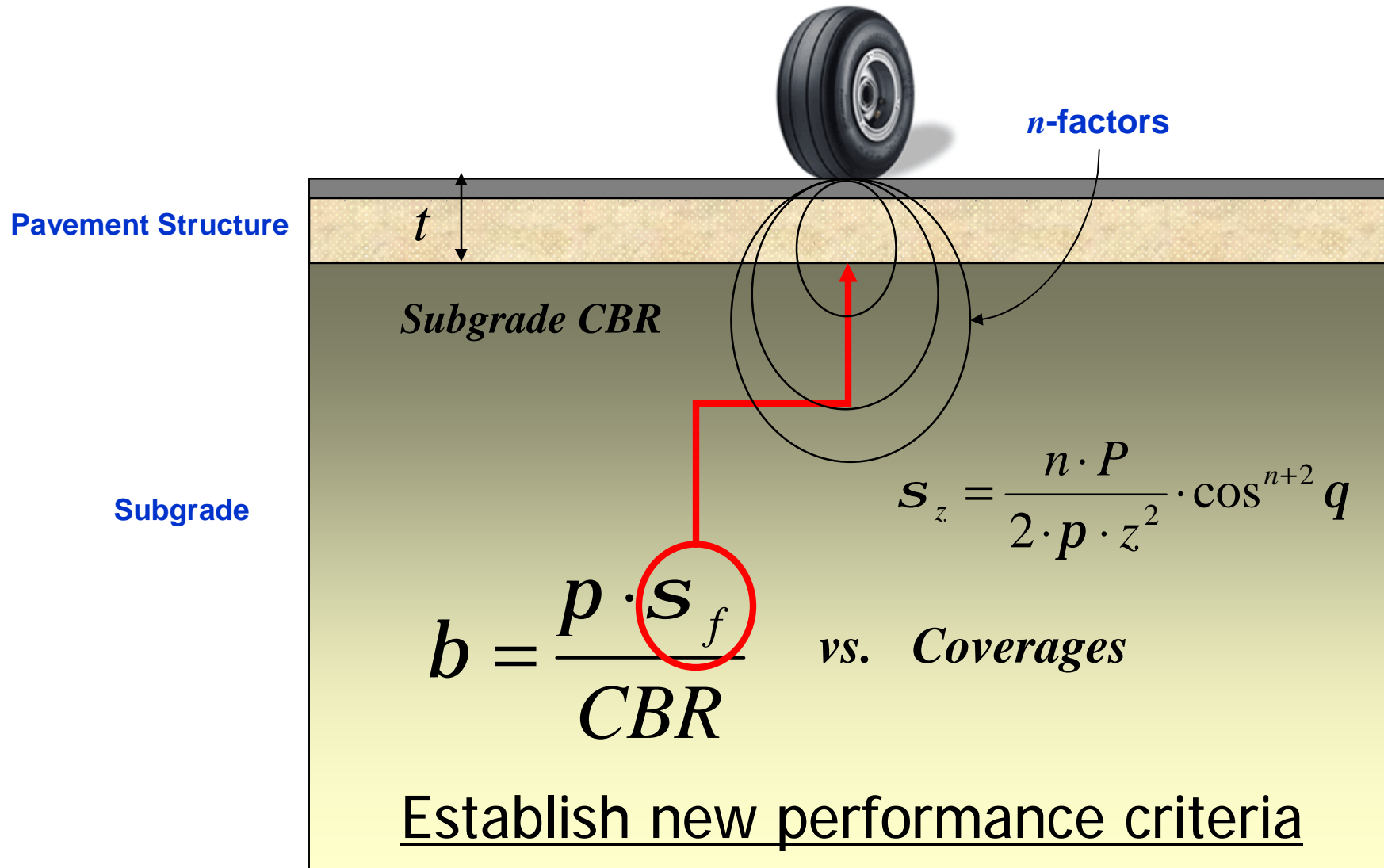


Proposed Design Procedure

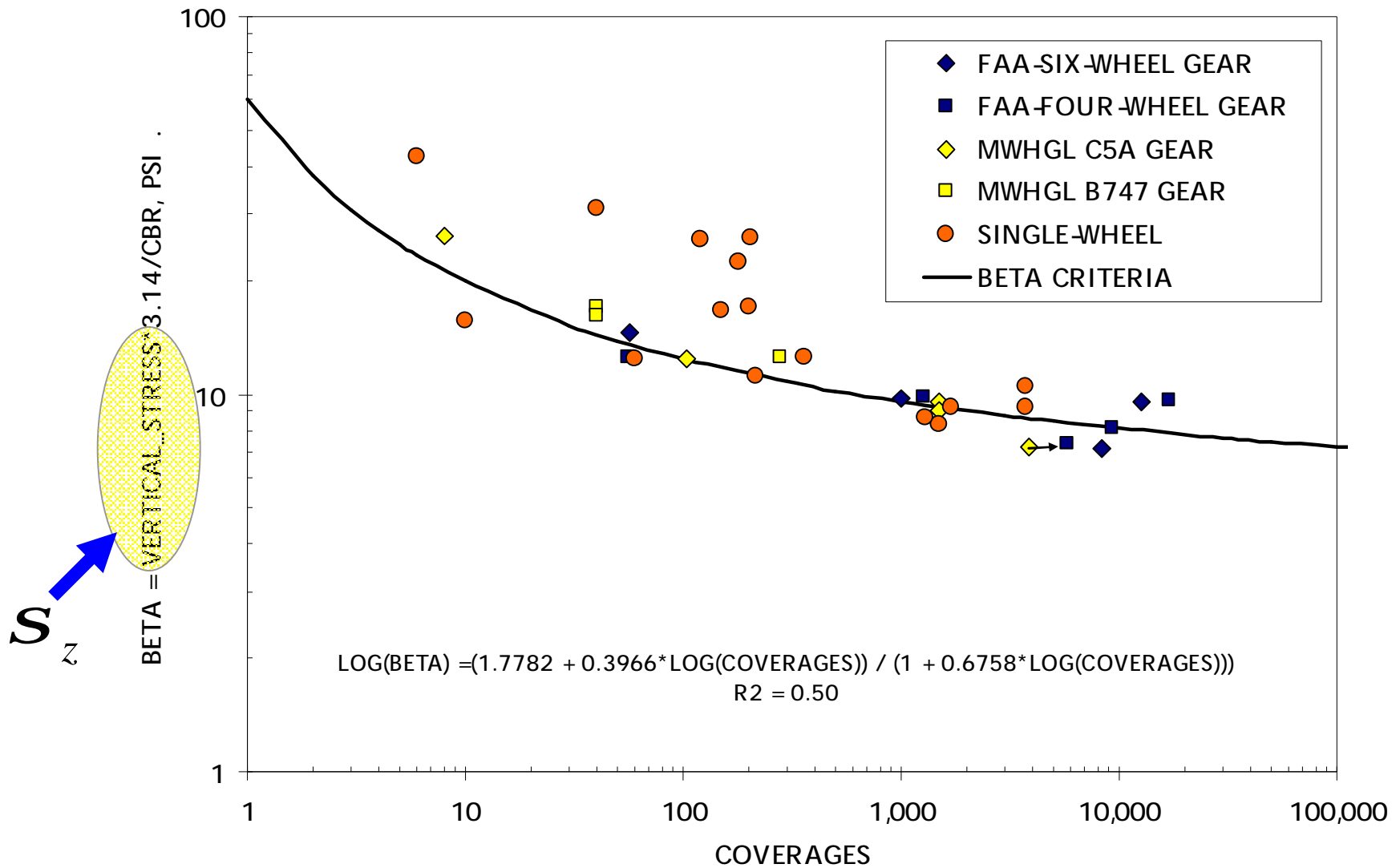
- Stress-based
- Load concentration (dispersion) factor
- No ESWL
- No α -factors



Fröhlich Stress Concentration Factor *n-factor* Changes the Stress Distribution



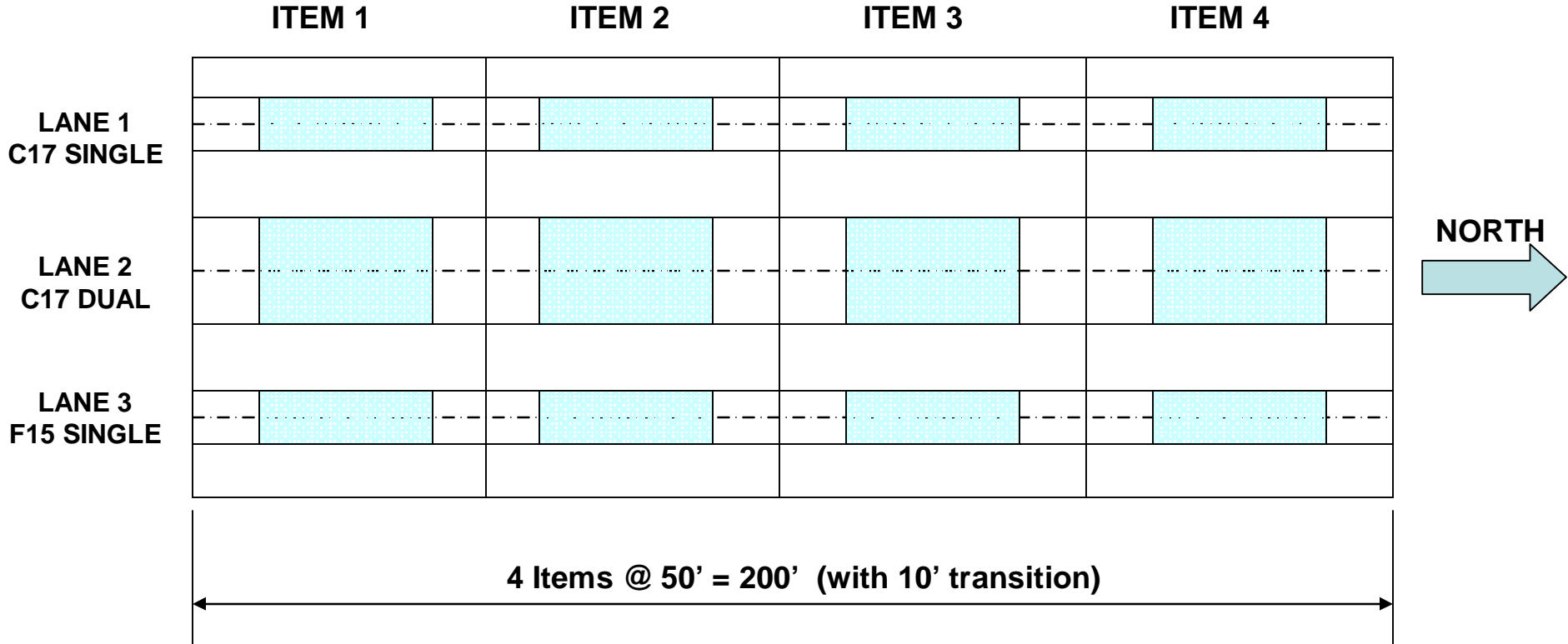
Proposed Stress-Based Criteria



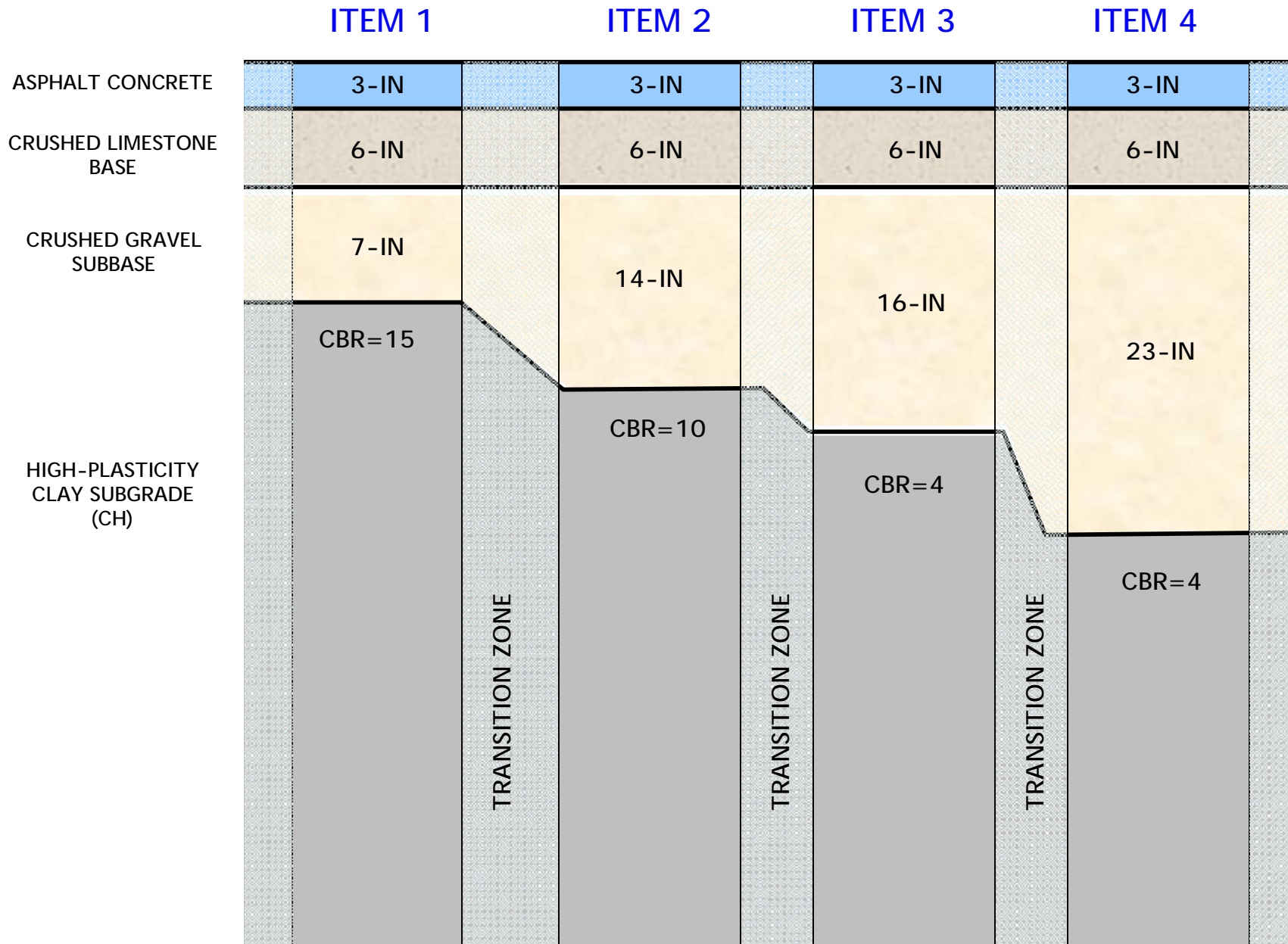
Hangar 4 Test Facility



LANE / ITEM IDENTIFICATION



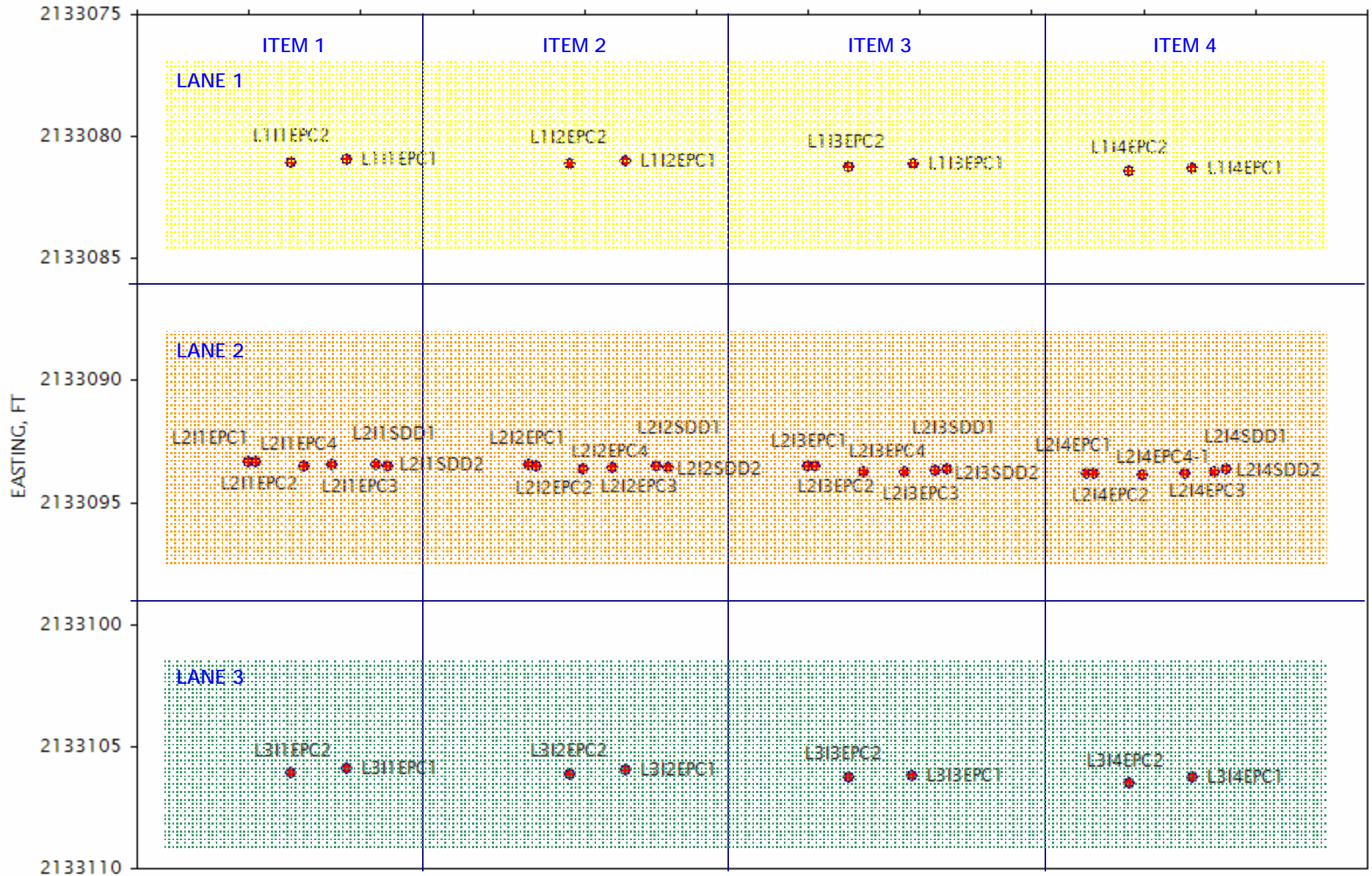
Pavement Cross Section Details



PLAN VIEW OF INSTRUMENTATION

NORTHING, FT

1019280 1019300 1019320 1019340 1019360 1019380 1019400 1019420 1019440 1019460 1019480 1019500



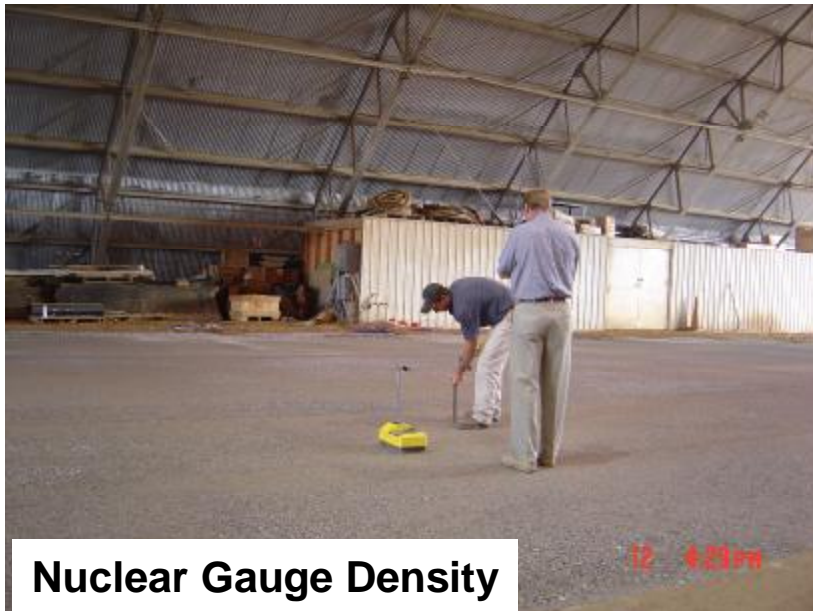
Field Data Collection



Surface Strain and Deflection



FWD

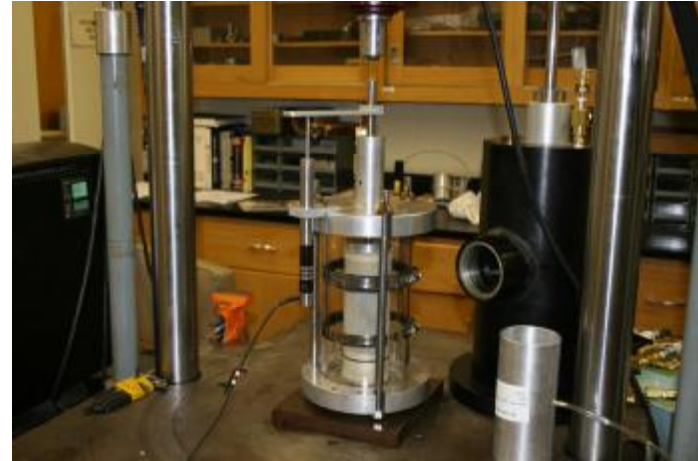


Nuclear Gauge Density



Drop Hammer Clay Samples

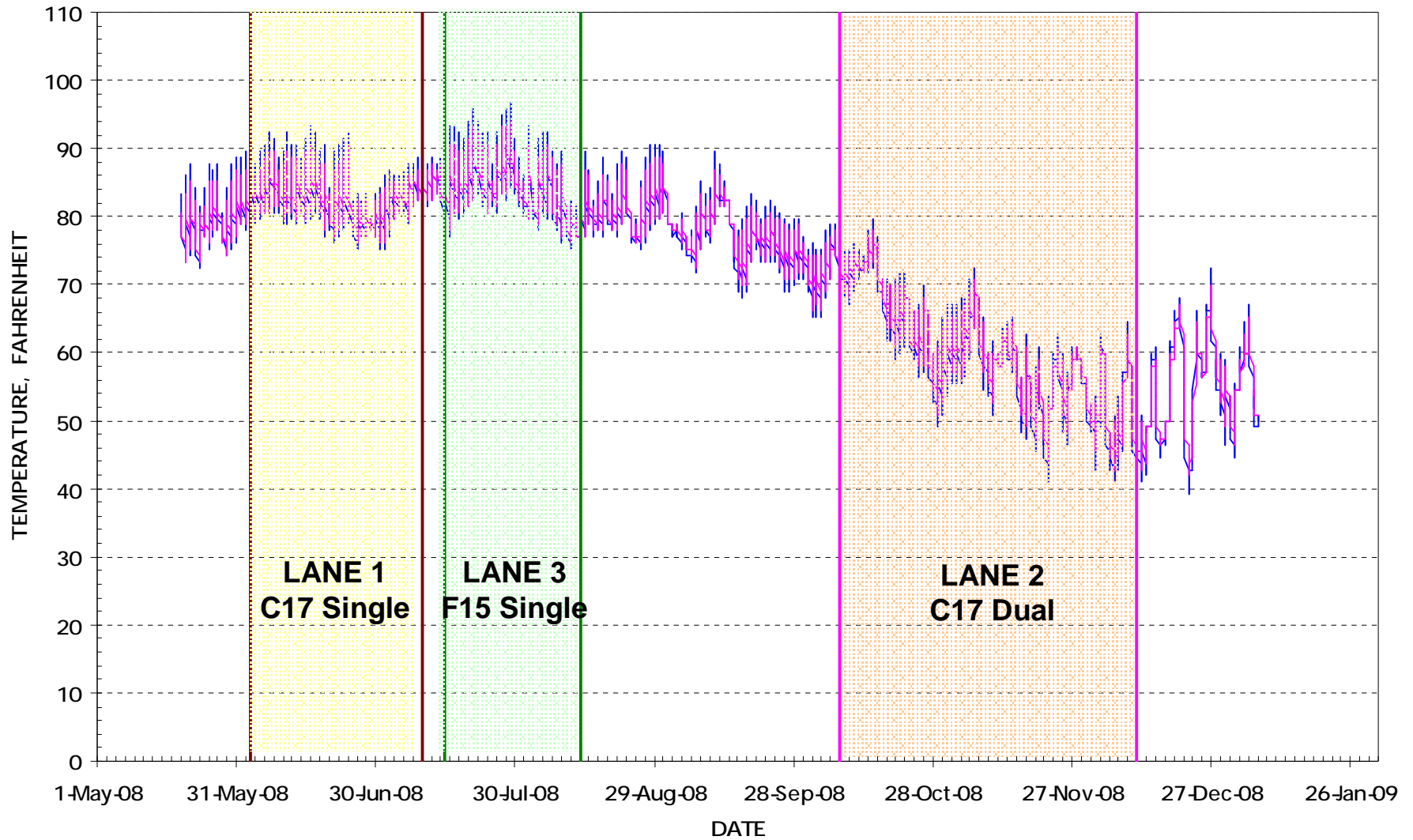
Laboratory Testing - Clay



Laboratory Testing – Base/Subbase



Pavement Temperatures During Traffic



HVS Loading



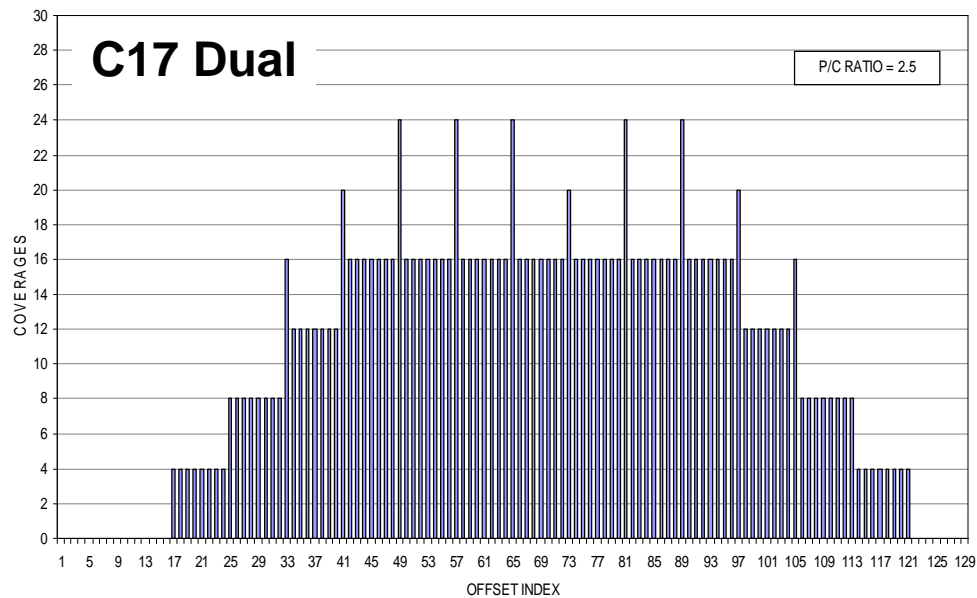
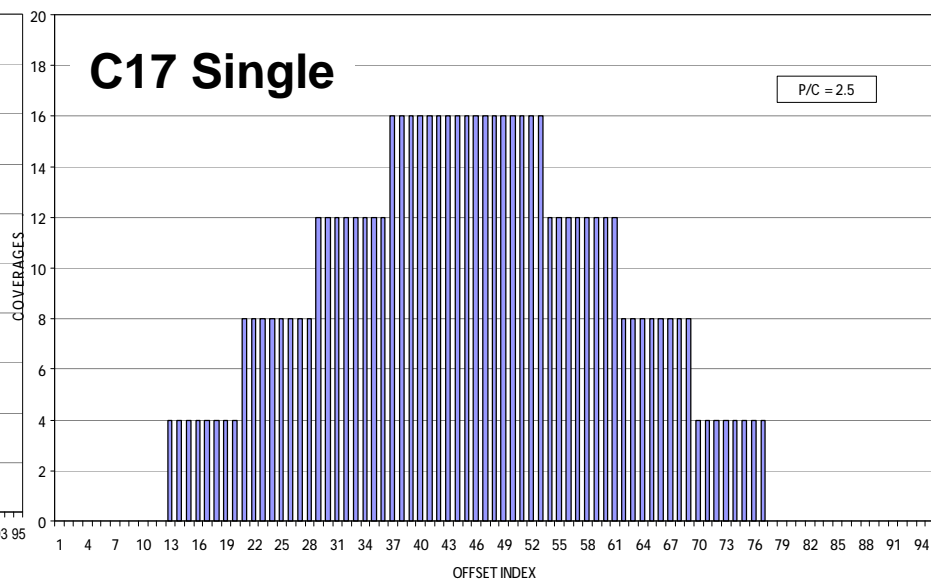
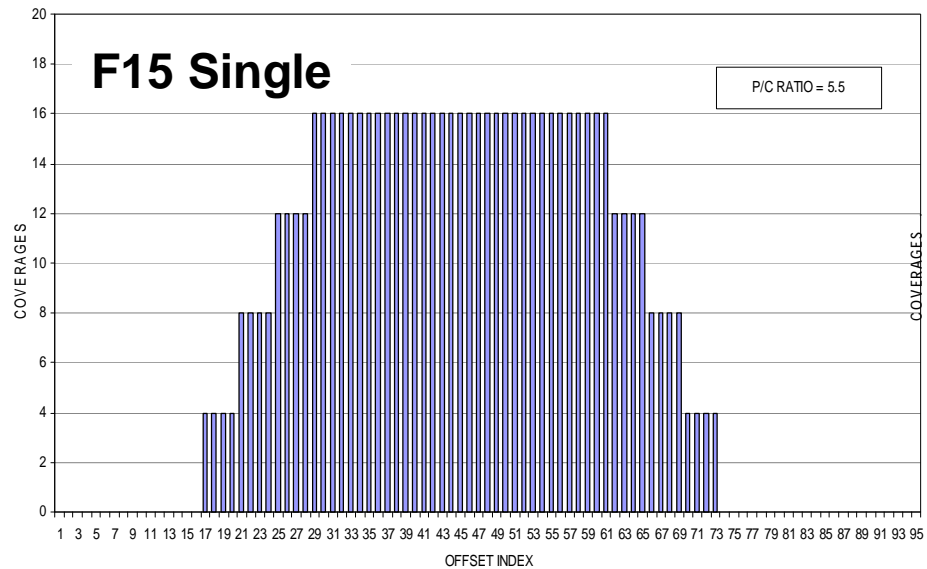
**C17 Single
45,000 lb**



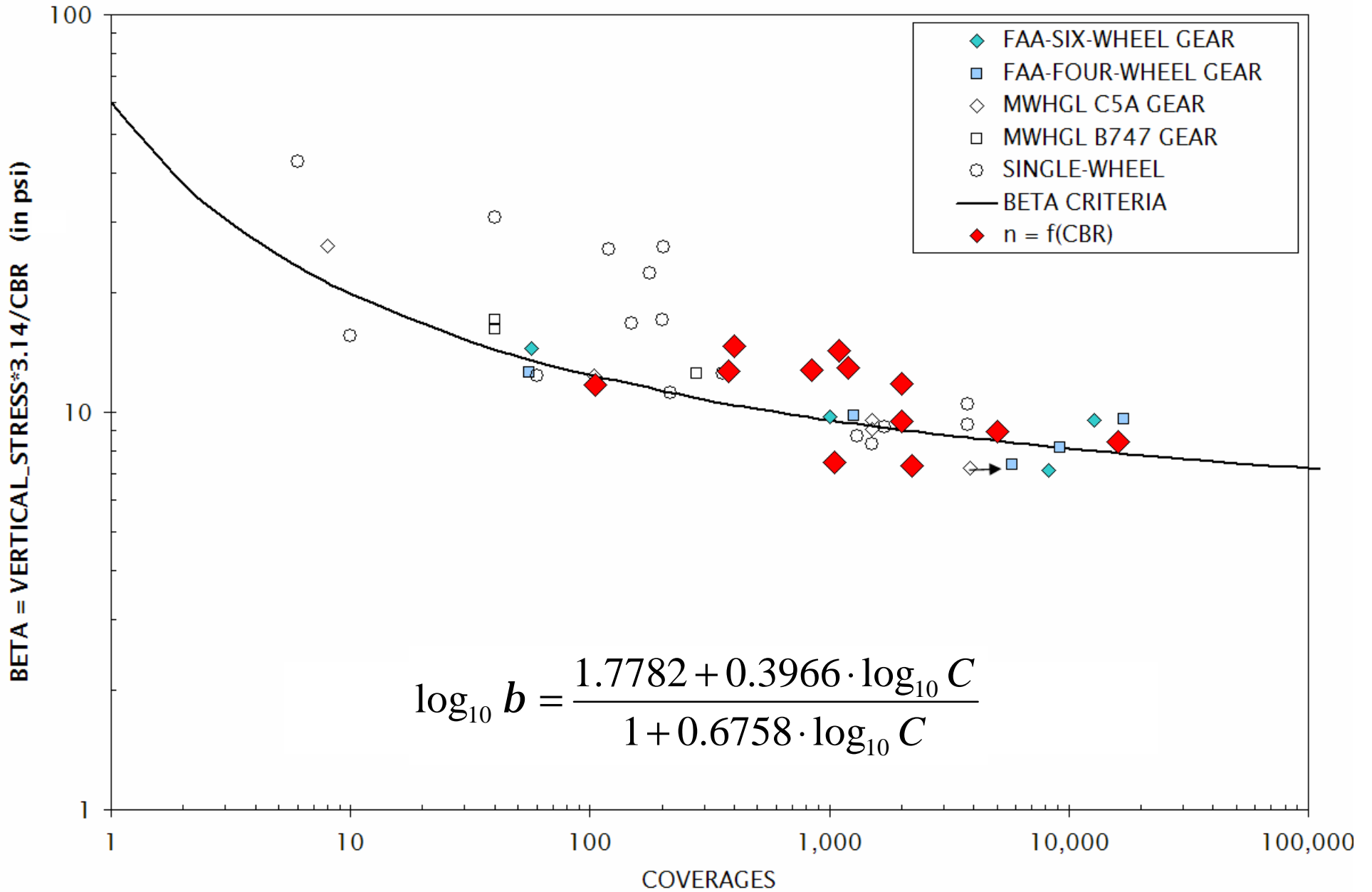
**C17 Dual
90,000 lb**

**F15 Single
35,000 lb**

Traffic Patterns



Performance Data from Test Section



Performance Data from Test Section

