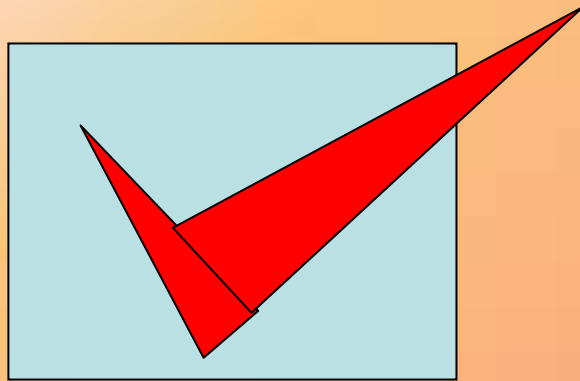


# PROFILER VALIDATION



**OK**

# OUTLINE

- **INTRODUCTION**
- **DATA COLLECTION:**
  - BASICS**
  - SITE SELECTION**
    - ROUGHNESS/TEXTURE**
    - LENGTH**
  - OPERATION GUIDELINES**
- **DATA ANALYSIS:**
  - HEADER**
  - IRI VALUES**
  - PROFILES**

# OBJECTIVE

**CAN THIS EQUIPMENT:**

**Collect a pavement profile and  
calculate a “useable”  $IRI_{80}$ ?**

*Some may expand to  $IRI_{50}$  &  $IRI_{120}$*

*Some may only want profile*

# **AASHTO *PROVISIONAL* STANDARD**

## **PP – 51**

### **PROGRAM TENENTS:**

- **TARGET PRODUCT - ACCURATE IRI**
- **MUST CHECK BOTH IRI & PROFILE DATA**
- **INCLUDE EFFECT OF “TIRE BRIDGING”**
- **A “GOLDEN PROFILER” WILL BE AVAILABLE**
- **PROFILE DATA ANALYSIS BY CROSS CORRELATION**

# TIRE BRIDGING

**PAVEMENT PATCH of ~ 3''**

**ALGORITHM MUST CORRECTLY PROCESS:**

**VARIOUS ASPHALT TEXTURE DEPTHS**

**FAULTS AND JOINTS**

**TINING (Transverse, Longitudinal, Diagonal)**

**BUMPS & LUMPS**

# **GOLDEN PROFILER**

## **EXPECTED CAPABILITY:**

- **Two Wheel Paths – 0.3 mile long - Less Than 4 hours**
- **Self Checks to Provide Assurance of Functionality**
- **Affordable for Each Agency to Own One**
- **Provide an Output Profile for Use as the STANDARD**

# DEFINITIONS

## USEABLE:

$USEABLE_{NOW} = ACCURATE\ IRI \pm (3\% + 1)$  99% confidence  
in the field environment (avg. 3 runs)

Example – A “True” 60 = (57 – 63) average of 3 runs

$USEABLE_{FUTURE} = ACCURATE\ IRI \pm (1\% + 1)$  average of 3 runs

## TRUE:

$TRUE_{NOW} = AVERAGE\ RESULTS\ OF\ MULTIPLE\ DEVICES$

$TRUE_{FUTURE} = “GOLDEN\ PROFILER”\ OUTPUT$

# HOW OFTEN?

## ROUTINE:

BASED ON ACCEPTABLE RISK & QA  
SUGGEST ANNUAL

## INCIDENT RELATED:

CHANGES TO:

SOFTWARE

HARDWARE REPAIRS

DISPUTE WITH QA MEASUREMENT

# UTILIZING A SYSTEM

## EQUIPMENT & OPERATOR

### MINIMIZE the OPERATOR COMPONENT

- STRAIGHT & LEVEL
- CLEARLY MARKED Pgmt. (MULTIPLE LINES)
- DETAILED INSTRUCTIONS
- CERTIFIED & EXPERIENCED OPERATORS

# **SITE PARAMETERS**

- **TEXTURE**

**REPRESENTATIVE OF THE STATE**

**ISSUES WITH HEAVY TEXTURE**

- **LENGTH**

**TEST SECTIONS - 250 ft. Min. – 500 ft. Preferred**

**TOTAL – 1000 ft. Min. for DMI**

**RUN UP - ACCELERATION + 300 ft. Min. (Stopping)**

- **CLEANLINESS**

**ACTIVE TRAFFIC LANE**

**SWEEPER**

- **EXTRA MARKINGS**

# **PRE COLLECTION**

**FRESH LIMIT MARKINGS**

**HEADER INFORMATION**

**MANUFACTURER'S CALIBRATIONS**

**SITE DESCRIPTION – Trial Run**

# CHECK the HEADER

- **SITE LOCATION / DESCRIPTION**
- **DATE / TIME**
- **EQUIPMENT & VALIDATION #**
- **SOFTWARE VERSIONS (collection & processing)**
- **FILTER SETTINGS**
- **ANY ODD USER PARAMS. AFFECTING RESULTS**
- **OPERATOR'S NAME & CERT. #**
- **SPEED – MIN., MAX., & AVERAGE**

**(IF NOT INCLUDED WITH EACH DATA SET)**

# **ACTIVE COLLECTION**

## **REPEAT RUNS:**

**10 “GOOD” RUNS -**

**5 @ FASTEST COLLECTION SPEED**

**5 @ SLOWEST COLLECTION SPEED**

**DO NOT SKIMP ON RUN-UP LENGTH**

**Plan for 12 or so runs to get these**

# **DATA REDUCTION / REPORTING**

**PERFORM on SITE**

**TWO REPORTS for EACH RUN -**

**IRI<sub>80</sub> (Text File)**

**SAME SUMMARY INTERVAL as FIELD TESTS**

**PROFILE ELEVATION (.ERD File)**

**MEDIA –**

**CD or DVD due to size of .ERD file**

# DATA ANALYSIS

(MARYLAND – PROPOSED AASHTO IS SIMILAR)

- **CHECK HEADER FOR COMPLIANCE**

- **IRI DATA ANALYSIS:**

  - Coefficient of Variation all 10 Runs**

  - Comparison - Average to Standard**

  - Select Runs for Profile Analysis**

- **PROFILE ANALYSIS:**

  - Cross Correlation of Selected Runs**

  - Cross Correlation of Average Run to Standard**

# CRITERIA

- **SITE DEPENDENT:**

**TRANSVERSE PROFILE**

**TEXTURE**

- **INTERVAL LENGTH DEPENDENT:**

**SUMMARY INTERVAL**

**Create IRI averages of intervals < 200 ft.**

**Minimum Profile Length = 250 ft.**

# STARTING CRITERIA VALUES

**IRI:**

**COEFFICIENT of VARIATION – 2%**

**DIFFERENCE FROM STANDARD – 1.3% +1**

**DMI:**

**COEFFICIENT of VARIATION – 0.1%**

**DIFFERENCE FROM STANDARD – 0.13%**

# **CRITERIA VALUES** cont.

## **PROFILE: Cross Correlation**

**Between 2 Selected Profiles – > 90%**

**Between Average Profile & Standard – > 80%**

**Judicious Site Selection Can Raise Both Values by 5%**

# REPORT

- **PERFORMANCE AGAINST EACH CRITERION**
- **ANALYSER CONTACT INFORMATION**
- **If Approved – VALIDATION NUMBER**  
**OPTIONAL – STICKER**  
**VALIDITY DATES**
- **CONSTRAINTS – INCIDENTS REQUIRING RETESTING**  
**REQUIREMENT FOR CERTIFIED OPERATOR**

# QUESTIONS?

**THANK YOU!**