Monday, August 31, 2020

CC8 NDT Test Plan – Phase III – Joint Comparison

The purpose of this testing is to compare the different types of joints (doweled and sinusoidal) and to determine if the sinusoidal joint can be used as a suitable longitudinal construction joint. The dates and frequency of the testing will be determined based on the duration of trafficking.

The testing and analysis done will be compared to the work done in the IPRF report "Joint Load Transfer in Concrete Airfield Pavements". The report concludes that joint stiffness is the key mechanistic parameter and it controls the load transfer and stress transfer characteristics of joints. A method for calculating joint stiffness from HWD data was developed and will be used with the CC8 data. Slab curling and temperature changes will be measured using various NDT devices and instrumentation to determine their effects on Joint Stiffness and Load Transfer. The database created from the study can be used to match environmental and temperature characteristics of the CC8 test section versus field site data.

Prior to the start of traffic testing on (3/1/18), the CSRA NDT team will perform the following tasks. Each task will be completed once before placing any loads.

1. **SurPro and Dipstick Profilers (Duration - 2hrs):** Take longitudinal and transverse profiles using the SurPro and Dipstick profiling devices. Due to the short section length, these profilers will be used in lieu of the NDT Van. This will ensure that the profiles cover the trafficked and non-trafficked areas as shown in the plan layout below. The profiles will be used to determine the longitudinal and transverse changes in the test section after testing is completed. The performance of each joint type will be evaluated and compared between different types.
2. **PSPA (Duration – 6 hrs):** PSPA testing will be conducted in accordance to the CC8 test plan. The testing will be done to determine the seismic modulus of each section before and after trafficking. PSPA will be collected in the longitudinal and transverse direction for each location. This data can be analyzed alongside the HWD data collected during trafficking. PSPA data will be used to monitor the condition of the pavement throughout trafficking. Changes in the seismic modulus can be attributed to cracking or other pavement distresses that may not be visible from the surface.
3. **HWD (Duration – 6-7hrs):** HWD testing will be conducted following the CC8 test plan. The target loading sequence will be: 12,000 lbs, 24,000 lbs, and 36,000 lbs with an approximate 36,000-lb seating load. HWD testing will be done to monitor the changes in deflection and modulus during the course of trafficking. The HWD data will be analyzed using the methods used in the IPRF study and used to determine the effectiveness of each joint type as described in the CC8 Joint Comparison traffic plan.
4. **MIT-Scan2-BT (Duration – 1hr):** The MIT Scan will be used to verify the dowel bar placement at all of the doweled joints in the CC8 test section. The MIT may also be used to determine the movement of the dowel placements (if any) during trafficking.

5. **Joint-Groove Profiler (Duration – 30min):** The Joint-Groove Profiler will be used across the joints in the locations shown below. This data will be used to monitor any movement across the joints as well as the formation of any distresses. A higher resolution profile can be achieved using the joint-groove profiler so any small changes that may occur across the joints can be observed using these profiles.
6. **ELATextur (Duration – 30min):** Texture measurements will be taken to monitor abrasion on concrete surface at both trafficked and non-trafficked sections for both the North and Southside in the test section. The measurement of texture is important to determine the effects of trafficking on the surface of the pavement and some changes in texture can be attributed to cracks and other distresses that form as a result.
7. **Walk Behind GPR (Duration – 1hr):** The walk behind GPR will be used to determine the layer thicknesses across multiple stations of the test section. This testing will be done to verify the construction thickness of each layer and to monitor layer thickness changes during the duration of testing of the subgrade layers as it is assumed the rigid pavement layers will not change.
8. **Rail to Rail Profiler (Duration – 30min):** The rail to rail profiler will be used to collect transverse profiles at the locations shown on the plan. This data will be used for device validation for the SurPro and Dipstick measurement devices. The profiles collected by each device will be compared to determine if the profiles are repeatable and any device is producing an abnormal profile.
9. **Leica 3D Scan (Duration – 4hrs):** The Leica Scan will take a 3D scan of the pavement surface across the entirety of the test section. From this data, profile lines can be determined and any slab movement can be monitored. The Leica data will provide a timeline of any slab movement and distress formation that the device is capable of picking up.
10. **2D/3D Imaging (Duration – 30min):** 2D/3D imaging data will be collected to monitor pavement distresses. The collected imaging lines will be stitched in the associated software and then analyzed using the updated crack detection software. The NDT Van 2D/3D imaging system is currently being updated by Waylink. The installation is scheduled for the week of March 26, 2018. Data will be collected following the installation.
11. Prior to the start of trafficking, CSRA will conduct a baseline visual distress survey on the concrete slab surface. The collected distress data will be uploaded into the PAVEAIR database. Prior to the distress survey, CSRA will establish a suitable database in PAVEAIR in which visual distress survey data will be entered.

Due to the ability to run multiple devices simultaneously, it is believed that all of the NDT testing can be completed within 6 -7 hours.

All the collected data will be stored on the G: drive under the CC8 Phase II Joint Comparison folder. Data files will be accessible on the G: drive within a week of the measurements. Pictures will be taken during testing to be uploaded to the photo database.

Baseline for all of the NDT devices with the exception of the HWD and PSPA will be prior to the seating load. Following the initial baseline data collection, post-seating load HWD and PSPA will be collected as the baseline for those devices. Following the ramp up, the NDT testing schedule will go as follows:

Testing During Traffic [On-Going]:

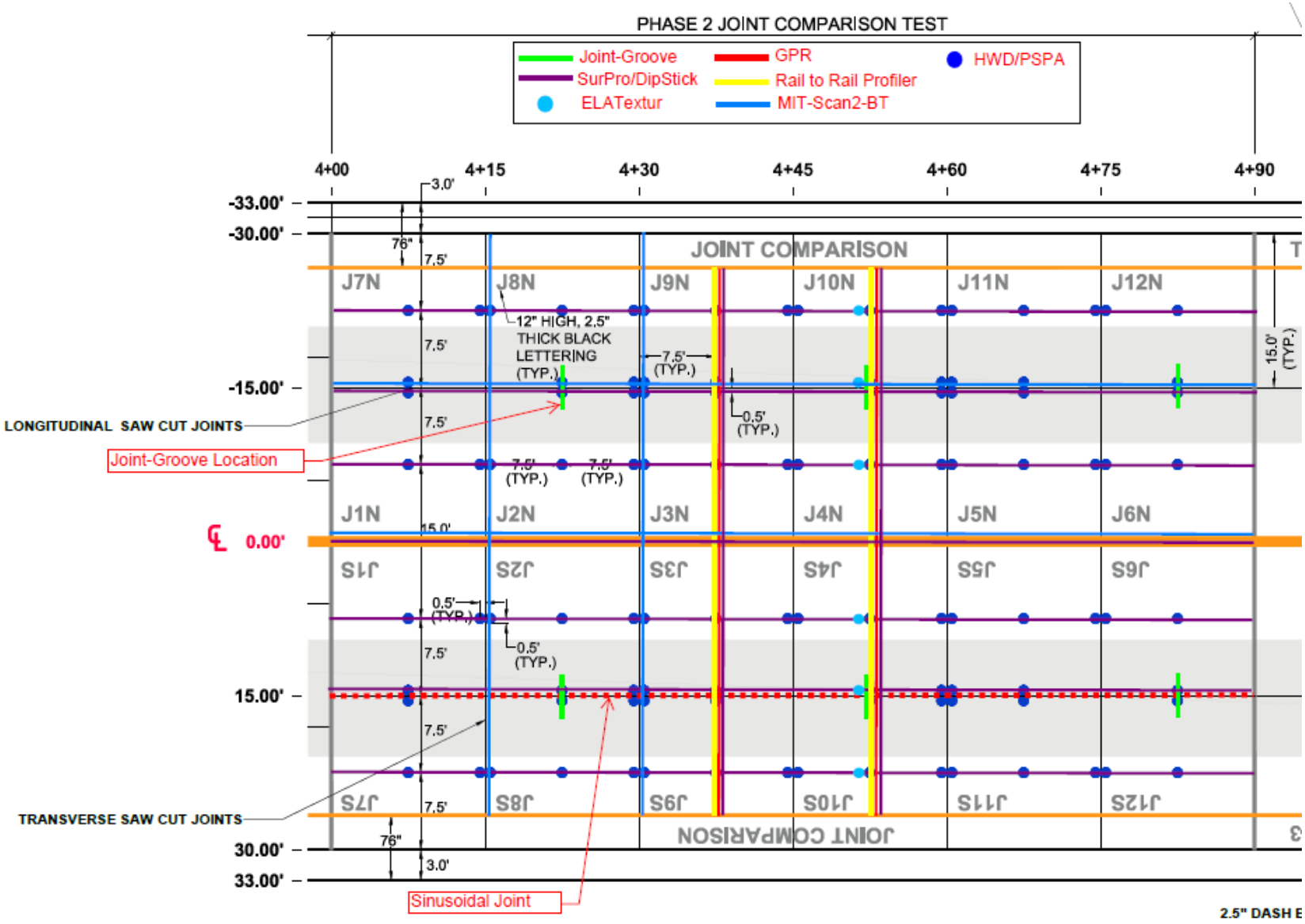
At the end of each day's trafficking, CSRA will perform a visual distress survey for rigid pavements in accordance with ASTM D5340. SCI calculations will consider the following distresses in accordance with AC 150/5320-6E: longitudinal, transverse, and diagonal cracking, corner breaks, intersecting cracks and shattered slabs, joint spalling, corner spalling, and shrinkage cracking. The collected data and calculated SCI will be updated daily in the PAVEAIR database by end of the day. The updated SCI will be reported to the FAA by the end of the day to facilitate go/no go decisions on traffic.

NDT Devices and Frequency of Data Collection:

Device	Frequency	Testing Duration
SurPro and Dipstick Profilers	Pre-Trafficking, Midway*, Post-Trafficking	2 Hours
PSPA	Weekly	6 Hours
HWD	Weekly	6-7 Hours
MIT-Scan2-BT	Pre-Trafficking, Post-Trafficking	1 Hour
Joint-Groove Profiler	Pre-Trafficking, Midway*, Post-Trafficking	½ Hour
ELATextur	Pre-Trafficking, Midway*, Post-Trafficking	½ Hour
Walk Behind GPR	Pre-Trafficking, Midway*, Post-Trafficking	1 Hour
Rail to Rail Profiler	Pre-Trafficking, Post-Trafficking	½ Hour
Leica Scan	Pre-Trafficking, Post-Trafficking	4 Hours
2D/3D Imaging**	Midway*, Post-Trafficking	½ Hour

***The Midway through trafficking collection date has occurred when the North side was at an SCI of 51. Another set of midway testing will be done when the south reaches a similar SCI (within the 50's) at the end of a trafficking week.

****2D/3D Imaging collection is dependent upon completion of system upgrades


PHASE 2 JOINT COMPARISON TEST
Joint-Groove
SurPro/DipStick
ELATextur
GPR
Rail to Rail Profiler
MIT-Scan2-BT
HWD/PSPA
4+00
4+15
4+30
4+45
4+60
4+75
4+90
-33.00'
-30.00'
-15.00'
0.00'
15.00'
30.00'
33.00'
JOINT COMPARISON
J7N
J8N
J9N
J10N
J11N
J12N
J1N
J2N
J3N
J4N
J5N
J6N
12" HIGH, 2.5" THICK BLACK LETTERING (TYP.)
LONGITUDINAL SAW CUT JOINTS
Joint-Groove Location
TRANSVERSE SAW CUT JOINTS
Sinusoidal Joint
2.5" DASH E