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EXTINGUISH THE TORCH MEETING

Project: Resurface & Roadside Improvements Polk Parkway (SR 570), MP 0-8
FIN: 436520-1-52-01 & 436520-3-52-01
Contract: E8Q95

SUMMARY REPORT

Project Team

CEI:

Senior Project Engineer:	Brian Crowl, PE - DRMP, Inc.
Project Administrator:	Tom Thursby, CBI - DRMP, Inc.
Contract Support Specialist:	Deysia Roberson - AE Engineering, Inc.

Turnpike:

Construction Project Manager:	Christopher Nesmith, PE/Fernando Gomez, PE
FDOT Project Manager:	Patrick Muench, PE
Production GEC Project Manager:	Jason Christopher, PE/Yang Zhao, PE

EOR:

Prime Roadway:	Gordon Greene, PE - Patel, Green & Associates, LLC
S&PM/Lighting/Signalization:	Alex Hinkle, PE – Protean Design Group

Contractor:

CWR Contracting, Inc.
2102 Jim Johnson Road
Plant City, Fl 33566

Contract Manager:	Richard Straily

Project Scope

This 3D Model & AMG Pilot Project consist of milling and resurfacing with overbuild, surperelevation corrections, base work, high friction surface treatment, guardrail, bridge joint remediation, resetting guardrail, drainage improvements, signing and pavement markings, signalization, lighting and other incidental construction along SR 570 Polk Parkway, from MP 0.00 to MP 8.00.

Lessons Learned

Issue	Resolution	Lesson Learned
Contractor and CEI had very little understanding of how to navigate the 3D model and did not have access to the model in the field because most field issued laptops cannot sufficiently operate CADD.	The contractor utilized a 3rd party and hired a professional surveyor. CEI hired a 3rd party at the beginning of the project and utilized our survey and design departments to assist us when needed. The EOR spent time to train the CEI CSS on how to extract data such as elevations and cross slopes from the model.	Training should be developed by FDOT and FTBA to better prepare CEI and Contractor's for the implementation of this new technology.
Occasionally during operation, the AMG equipment would suddenly send the miller or paver to an unusual milling depth or asphalt grade.	Possibly better QC review by the EOR to make sure all lines/triangles are connected. This could eliminate the unwanted depth/thickness changes.	When this occurred, we found it best to stop only briefly and move ahead with the operation while waiting for the model to correct.
QC and VT recorded instances where the elevations would be within tolerance, but the cross slope would not match.	The milling and paving elevation tolerance was 0.5". This tolerance allowed the elevation to be acceptable while the corresponding cross slope was not. The milling and paving was accepted based upon QC and VT elevation measurements.	On future projects it should be specified which is more important, elevation or cross slope. With 3 elevation shots being taken across the lane every 25', are cross slope measurements necessary since the same information can be deduced from the as-built elevation data?

Specialized software and equipment were required for this project that most contractors and CEI's do not possess.	CEI costs were in excess of $40,000, while the contractor's costs were approximately $400,000 for the equipment and survey tools.	We expected additional costs with the new technology needed for this pilot project but did not anticipate them being so steep.
When comparing the measured quantities of milling and paving to the SQ sheets we have found substantial differences resulting in significant quantity overruns of approximately $292K combined. All lane widths were measured during each operation by the Contractor QC and the CEI VT. Our The field measured quantities do not match the SQ sheets because the Model and measured lane widths differ.	Payment was made per the job specifications. All milling and paving overruns/underruns, although measured in the field were subject to adjustment as they were plan quantity items.	The lane widths in the model and SQ sheets should be verified by actual field measurements.
Because of the tolerances allowed by Specifications for the equipment and the tolerances allowed for the accuracy of structural asphalt and FC-5 asphalt, it is not possible to place FC-5 (3/4") by using the AMG equipment. Using AMG for FC-5 can result in breaking/crushing the aggregate in the FC-5 mix and thereby reducing the quality of the asphalt.	FC-5 paving was done conventionally without the use of the 3D model or AMG equipment.	On future projects, the specifications should be changed to allow for FC-5 to be placed utilizing non-AMG equipment.
Large trucks passing between the robotic total stations and AMG equipment interrupted the connection. The connection was also limited by other factors such as horizontal and vertical curves, rain, fog and smoke.	Milling and paving operations were halted until connection was restored.	Contractor needs to be aware there are physical and environmental factors that can impact the connection between the AMG equipment and Robotic Total Stations.
3D model files supplied to the contractor and CEI needed to be converted to be compatible with AMG and survey equipment.	The CEI and Contractor relied on a 3rd party to convert the files to a usable format.	Files compatible with AMG and survey equipment should be provided to both the CEI and Contractor.
QC and VT did not have the ability to extract cross slope data from the 3D model in the field. A production computer is required to view and extract information from the model. This process is time consuming and field staff does not have the time or equipment to do this.	Cross slope data was exported to an excel file for QC and VT to utilize.	Field staff was not able to access the 3D model in the field. Coordination with office staff prior to a milling and paving shift was necessary to obtain the information needed.

The CEI scope did not clearly state the expectations for as-builts. Both 2D and 3D plans were utilized for this project. The 2D plans lacked standard deliverables such as roadway and drainage cross sections. If there are changes made to the roadway or drainage cross sections, the as-built deliverable expectations must be clearly noted.	CEI provided 2D as-builts. The EOR entered milling and paving elevation data into 3D model.	If the Department proceeds with similar projects in the future, the format of the as-builts needs to be clarified. If changes must be documented in the CADD or 3D models on future projects, again, we must consider the knowledge gap.
CEI does not typically have experience operating CADD software. This project required data such as cross slopes, cross sections, elevations, widths, etc. to be extracted from the 3D model. Our staff was not experienced with this and was told it could take upwards of 6 months of training to be efficient at navigating the 3D model.	CEI utilized the FDOT CADD training which was helpful in some instances but was geared more toward design. The EOR provided training to the CEI CSS on how to extract certain information from the file. CEI utilized their survey and design group to assist with navigating the model.	The Department should develop training resources geared towards non-designer users. During the transition from conventional to 3D projects, the Department should consider allowing time for a CADD technician in the CEI contract.
Based on our field observations and working with the Contractor, the AMG technology is better suited at this point for use with the milling machine more so than with the paving machine. The paver is not able to move as freely as the milling machine to respond to the 3D model elevation changes.	Continue developing the AMG technology and the paving machine technology/capability to be more responsive to elevation, cross slope and superelevation changes or limit the requirements in the 3D model. Possibly have the specification added to require the Contractor stop paving operations when the cross slope of the roadway makes challenging elevation changes that cannot be achieved.	The milling machine is more capable of meeting the 3D model requirements for elevation and cross slope.