

Intelligent Compaction Training



BUILT FOR IT.

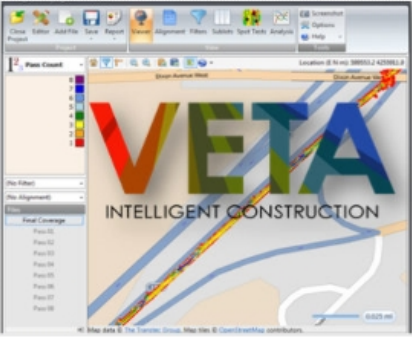




IC Overview

INTELLIGENT COMPACTION

One-stop shop for IC

[LEARN IC](#) [VETA](#) [EQUIPMENT](#) [PROJECTS](#) [SUPPORT](#)



MANY DATA SOURCES... ONE STANDARD TOOL

IC Support Veta Upgrade Learn IC in a Day Specifications

View helpful info and contact us for support at our IC Technical Support Service Center.

Download the latest version of Veta, the IC data management and analysis software.

Attend an IC workshop and learn how to use IC to ensure longer pavement lives.

View and download asphalt and soils IC specifications.

Intelligent Compaction News

[View all IC news →](#)

April 28th, 2016 April 8th, 2016 March 31st, 2016

Veta 4.0.110 Released **Veta 4.0 Released** **IC Specs Are Updated**



With the conventional compaction measurement, what percentage of the surface is actually tested?



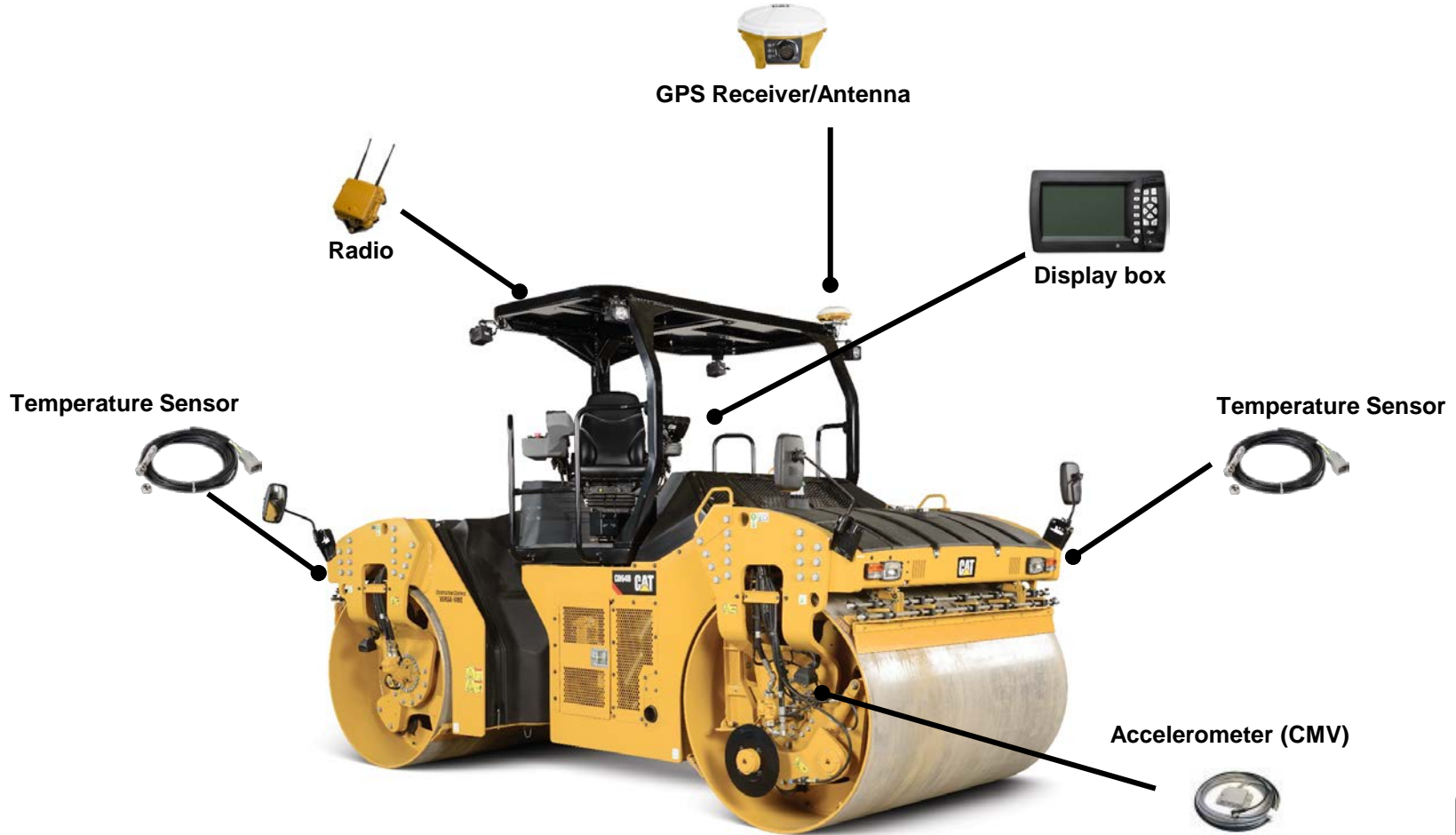
Less than 1%

Basic Components of IC:

1. Positioning (GPS) – Pass Counting & Location
 - Global Positioning System (GPS), SBAS, UTS, VRS
2. Compaction Meter Value (CMV)
 - accelerometer
3. Temperature measurement
4. Color-coded video display of “real-time” info
5. Office software – VisionLink™ (Caterpillar/Trimble software)
 - Storing & analyzing data
 - VETA 4.0 (FHWA Software for analyzing data)



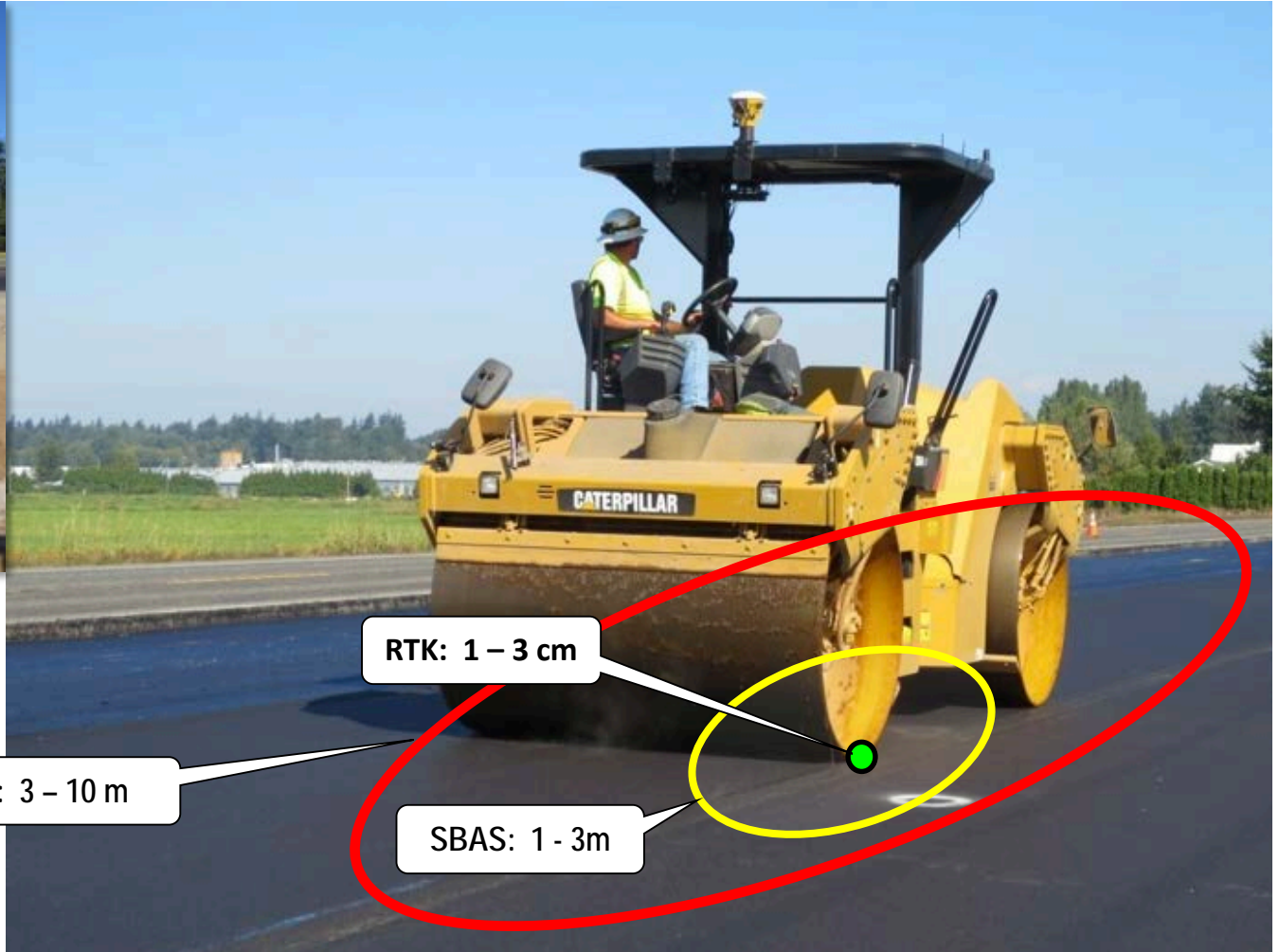
Components of IC Roller



Operator's view.....



Positioning Accuracy



RTK: 1 - 3 cm

Autonomous: 3 - 10 m

SBAS: 1 - 3m

Base Station & Rover



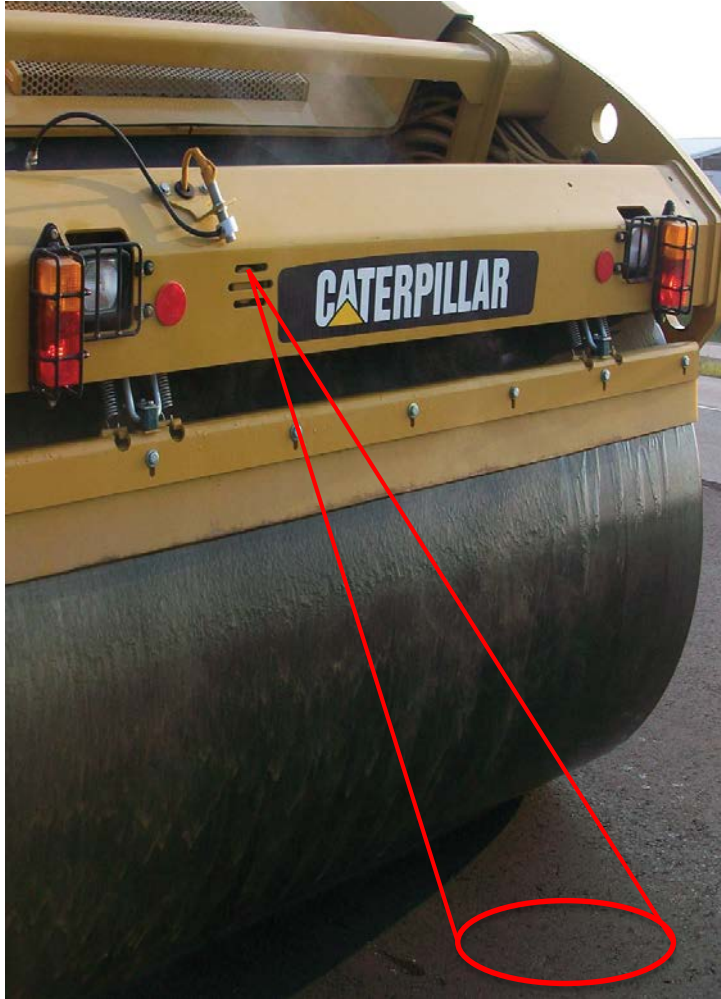
- Base station gives RTK-GPS accuracy
- Rover is used to verify roller positioning system
- Rover can also be used to identify “points of interest” on the job

Pass Count: Number of Passes



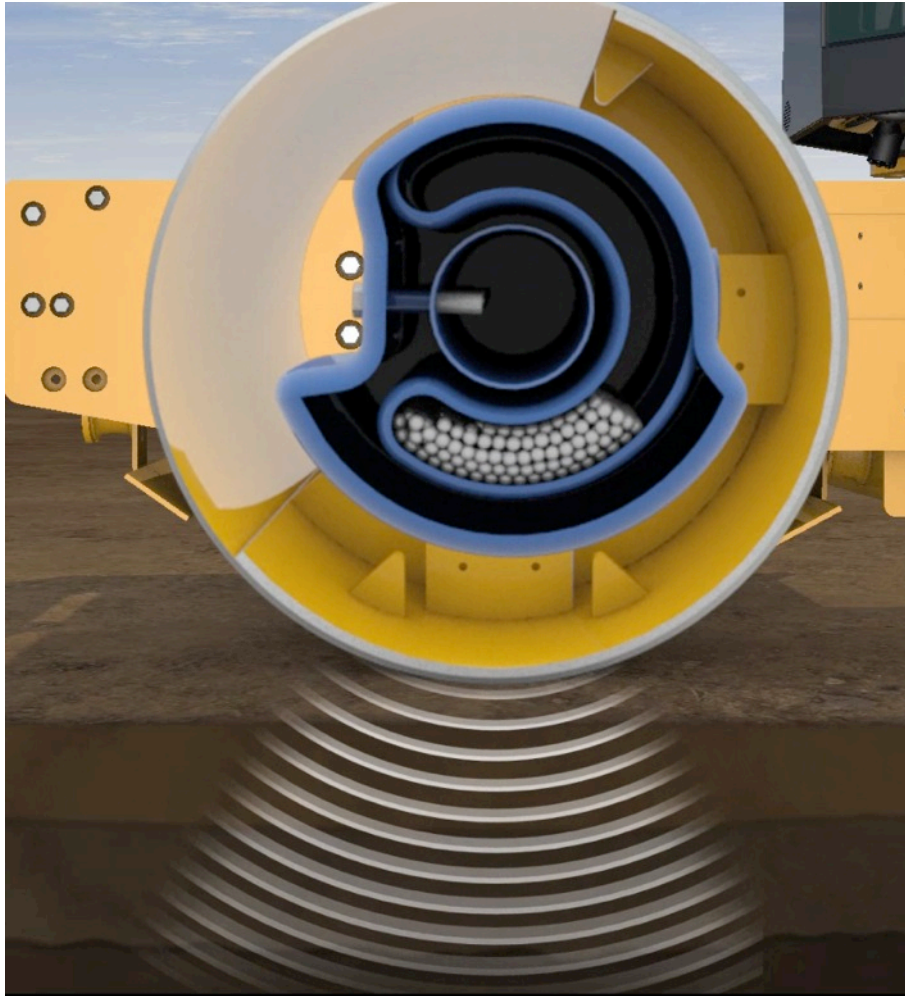
- Number of Passes over any area is known because GPS positioning data is recorded and stored on the machine
- All other data is stored by position (location)
- All data is “time-stamped”

Temperature Measurement



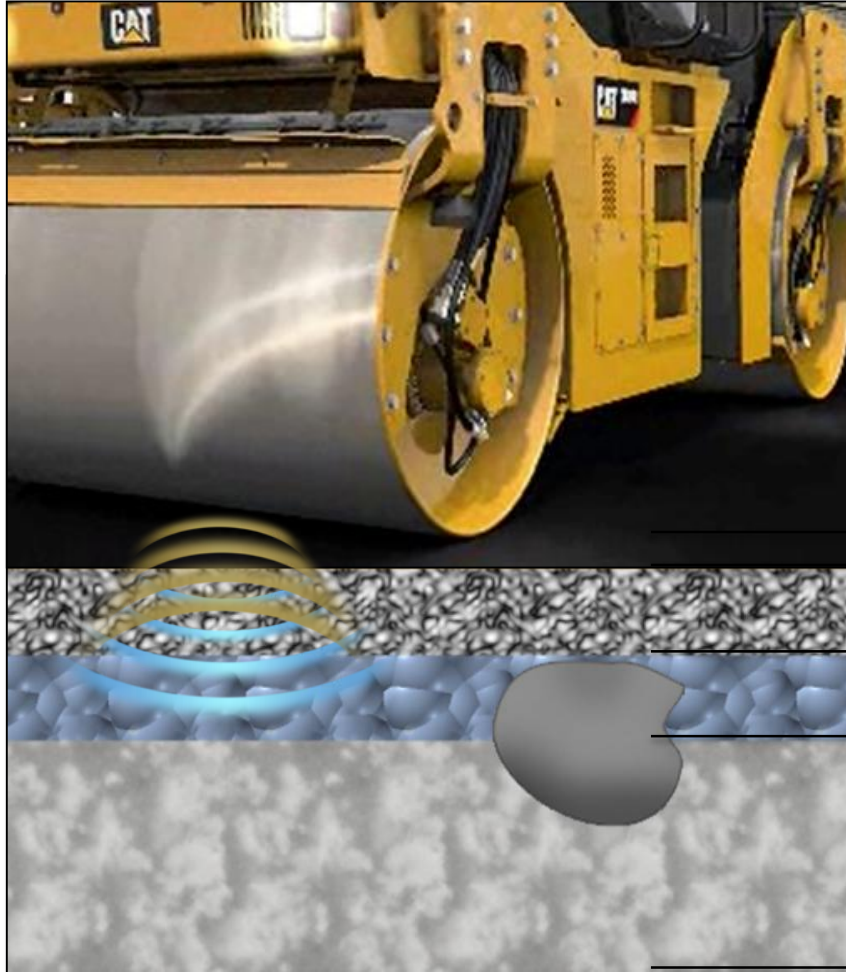
- Dual temp sensors to allow mat temp reading ahead of water spray from the drum
- Keeps operator informed of temperature zones
- Can help avoid tender-zones
- Eliminates hand-held devices
- Temperature data is tied to position by GPS

Accelerometer: Measures Material "Stiffness" (rebound)



- CMV value comes from accelerometer
- Vibration is required to get CMV
- Measuring "stiffness" - not density
- Mounted at front drum
- CMV is located by GPS

Accelerometer measures more than lift being paved...



- Accelerometer technology measures deeper than the freshly paved lift of asphalt
- CMV is a *composite measurement of the current lift and the layers below it*

Mat being compacted

Existing HMA lift

Sub-base

Subgrade material

Color-coded Video Display



Maps show:

1. Number passes
2. Temperature map
3. CMV map

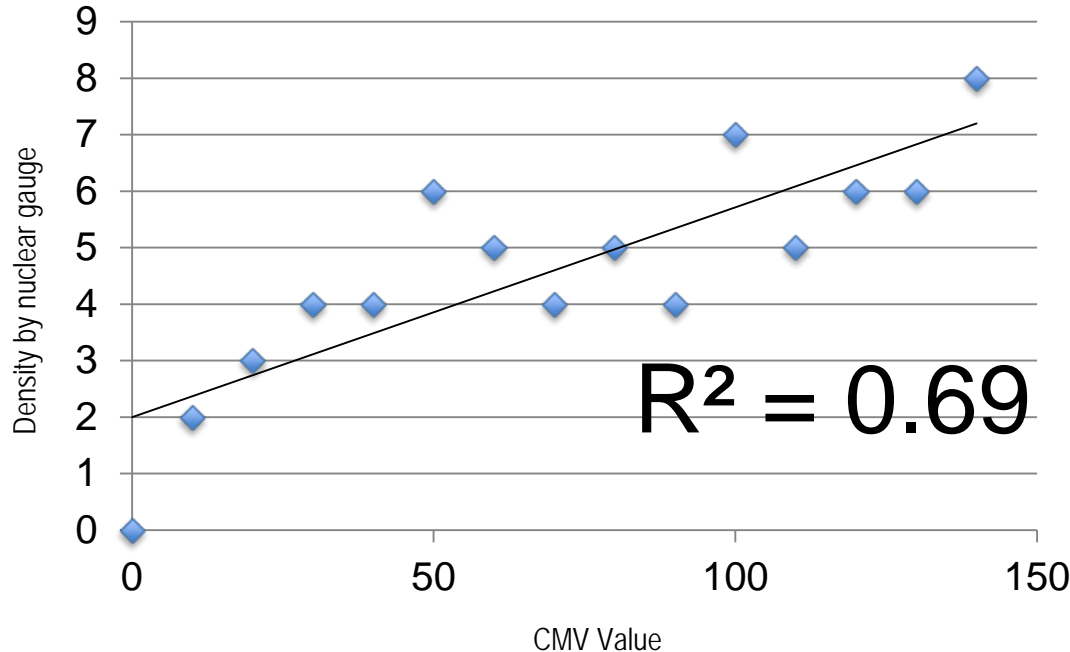
Operator can toggle between 3 maps

Other information is shown along the side panel

Correlation of CMV with existing test methods



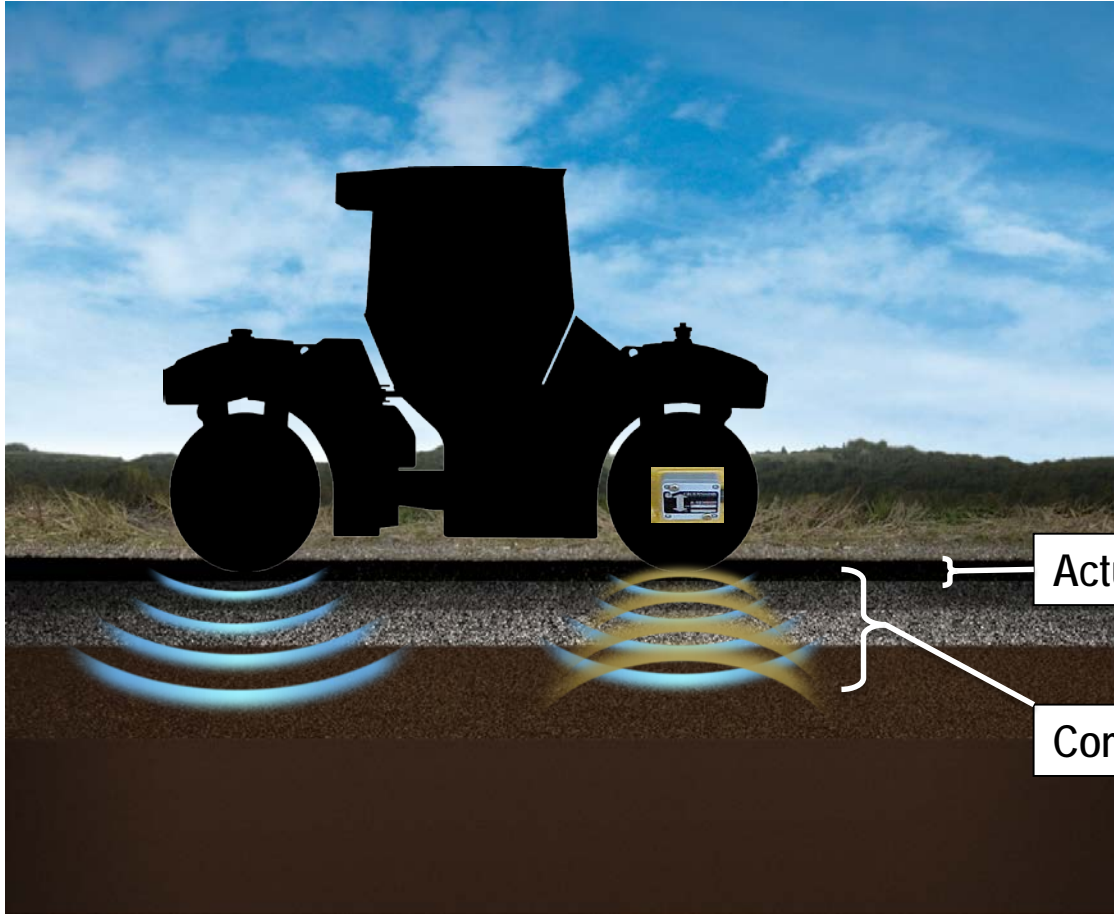
Correlating CMV with existing test methods



$R^2 = 1.00$ = perfect correlation

- Plot a linear regression analysis of core data and CMV data to establish an R^2 value
- VEDA 4.0 plots correlation
 - if density data can be uploaded
 - Needs a minimum of 3 passes
- R^2 is an indication of how well CMV represents the density or other test method (i.e. LWD)
- Repeatable correlations have not been proven

Accelerometer measures more than lift being paved...



- Measurement depth varies based on amplitude setting
- Useful indicator of base and sub-base layer stiffness

Actual pavement thickness

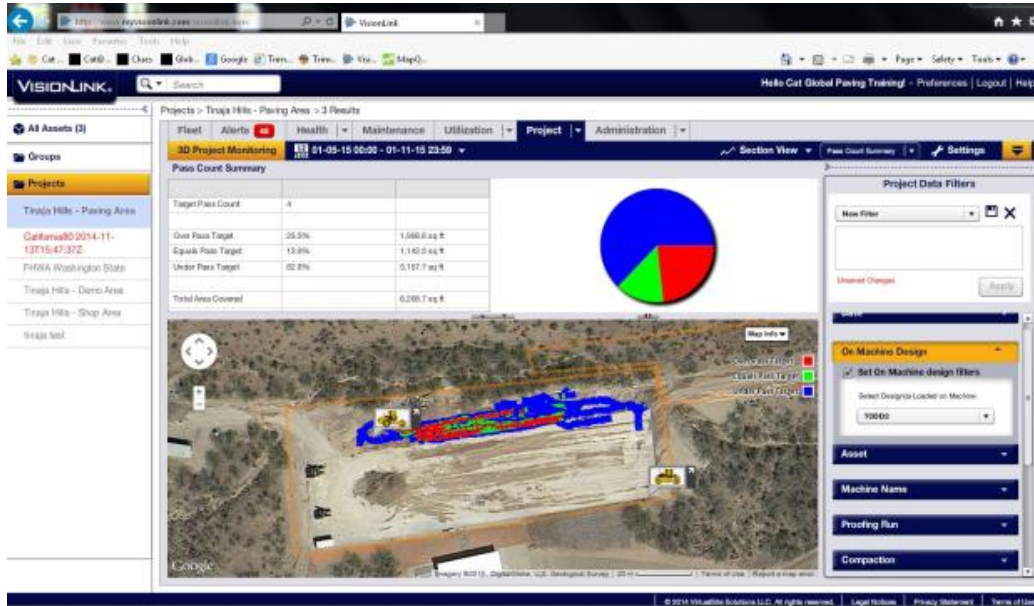
Compaction measurement reading

Things to understand about CMV...

- CMV is an indicator of material stiffness, not a measure of density.
- CMVs are influenced by sub-surface conditions up to 6 feet below the surface
- **CMVs are influenced by many factors:** speed, direction, amplitude, frequency, material properties, and more...
- Correlations between CMV and conventional measurement methods are difficult to achieve, but possible in some cases (LWD)
- Repeatable correlations between CMVs and Density have not been shown to exist
- CMV values are not comparable between machines (unless ALL conditions are equal)

CMV \neq Density

VisionLink™ Data Management & Analysis Software



- Compaction module in VisionLink
- Web-based
- Data uploaded wirelessly or by USB flash drive
- Need a paid subscription and user-account
- Login at www.myvisionlink.com

VisionLink™ screens and data file in *.csv format

VisionLink
www.myvisionlink.com
Hello Cat Global Paving Training! - Preferences | Logout | Help

Projects > California0 - 3 Results
3D Project Monitoring 09-04-13 12:00 AM - 02-07-14 11:59 PM

Project Data Filters
Date: 09-04-13 12:00 AM - 02-07-14 11:59 PM
On Machine Design: NO ERL N02

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Projects > California0 - 3 Results
3D Project Monitoring 09-04-13 12:00 AM - 02-07-14 11:59 PM

Project Data Filters
Set On Machine Design Filters
Select Design(s) Linked on Machine: NO ERL N02

VisionLink
www.myvisionlink.com
Hello Cat Global Paving Training! - Preferences | Logout | Help

Projects > California0 - 3 Results
3D Project Monitoring 09-04-13 12:00 AM - 02-07-14 11:59 PM

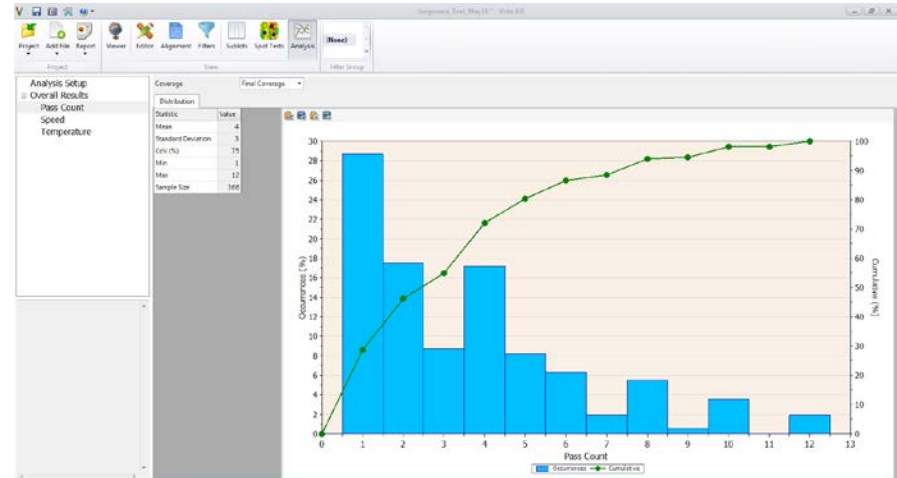
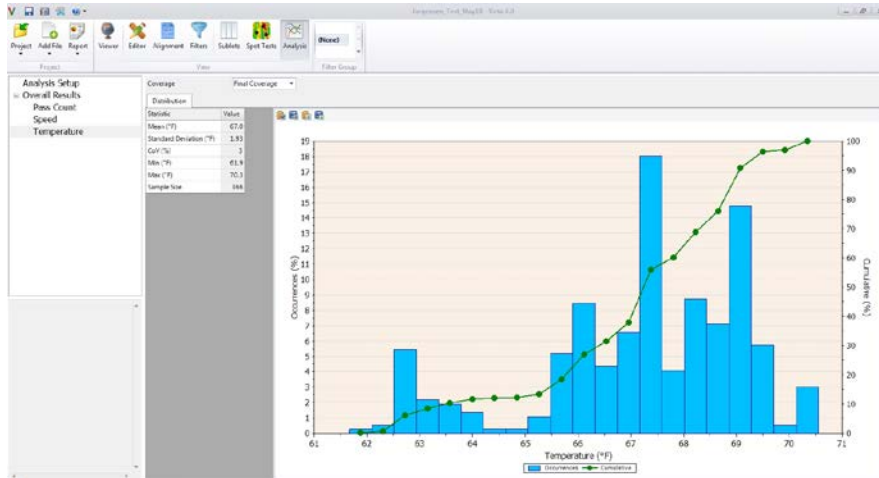
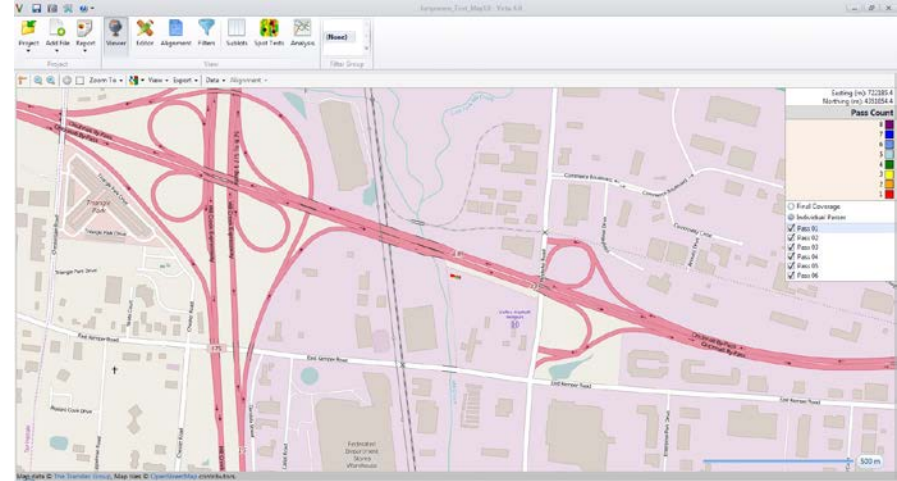
Project Data Filters
Set On Machine Design Filters
Select Design(s) Linked on Machine: NO ERL N02

Microsoft Excel
Home | Layout | Tables | Charts | SmartArt | Formulas | Data | Review | View | Help

AT	Date	CTR	CWR	PostCount	LastMachineID	Design Name	Machine	Speed	Lanes/Passes	GR/Act/F	Target/Passes	Layers	Lat/CMV	Target/CMV	Last/OP	Target/OP	Last/Req	Last/Req
2	2013/Aug/08	14253748.36	1029921.853	1	0	080813F1E3T	6.54E+14	2.8mph	RTK Fixed	Medium 0.1	3	1	1	3	5	7	7	7
3	2013/Aug/08	14253749.48	1029921.853	1	0	080813F1E3T	6.54E+14	1.8mph	RTK Fixed	Medium 0.1	3	1	1	3	5	7	7	7
4	2013/Aug/08	14253750.60	1029921.853	1	0	080813F1E3T	6.54E+14	2.8mph	RTK Fixed	Medium 0.1	3	1	1	3	5	7	7	7
5	2013/Aug/08	14253751.72	1029921.853	1	0	080813F1E3T	6.54E+14	3.8mph	RTK Fixed	Medium 0.1	3	1	1	3	5	7	7	7
6	2013/Aug/08	14253752.84	1029921.853	1	0	080813F1E3T	6.54E+14	2.8mph	RTK Fixed	Medium 0.1	3	1	1	3	5	7	7	7
7	2013/Aug/08	14253753.96	1029921.853	1	0	080813F1E3T	6.54E+14	1.8mph	RTK Fixed	Medium 0.1	3	1	1	3	5	7	7	7
8	2013/Aug/08	14253755.08	1029921.853	1	0	080813F1E3T	6.54E+14	2.8mph	RTK Fixed	Medium 0.1	3	1	1	3	5	7	7	7
9	2013/Aug/08	14253756.20	1029921.853	1	0	080813F1E3T	6.54E+14	3.8mph	RTK Fixed	Medium 0.1	3	1	1	3	5	7	7	7
10	2013/Aug/08	14253757.32	1029921.853	1	0	080813F1E3T	6.54E+14	2.8mph	RTK Fixed	Medium 0.1	3	1	1	3	5	7	7	7
11	2013/Aug/08	14253758.44	1029921.853	1	0	080813F1E3T	6.54E+14	1.8mph	RTK Fixed	Medium 0.1	3	1	1	3	5	7	7	7
12	2013/Aug/08	14253759.56	1029921.853	1	0	080813F1E3T	6.54E+14	2.8mph	RTK Fixed	Medium 0.1	3	1	1	3	5	7	7	7
13	2013/Aug/08	14253760.68	1029921.853	1	0	080813F1E3T	6.54E+14	3.8mph	RTK Fixed	Medium 0.1	3	1	1	3	5	7	7	7
14	2013/Aug/08	14253761.80	1029921.853	1	0	080813F1E3T	6.54E+14	2.8mph	RTK Fixed	Medium 0.1	3	1	1	3	5	7	7	7
15	2013/Aug/08	14253762.92	1029921.853	1	0	080813F1E3T	6.54E+14	1.8mph	RTK Fixed	Medium 0.1	3	1	1	3	5	7	7	7
16	2013/Aug/08	14253764.04	1029921.853	1	0	080813F1E3T	6.54E+14	2.8mph	RTK Fixed	Medium 0.1	3	1	1	3	5	7	7	7
17	2013/Aug/08	14253765.16	1029921.853	1	0	080813F1E3T	6.54E+14	3.8mph	RTK Fixed	Medium 0.1	3	1	1	3	5	7	7	7
18	2013/Aug/08	14253766.28	1029921.853	1	0	080813F1E3T	6.54E+14	2.8mph	RTK Fixed	Medium 0.1	3	1	1	3	5	7	7	7
19	2013/Aug/08	14253767.40	1029921.853	1	0	080813F1E3T	6.54E+14	1.8mph	RTK Fixed	Medium 0.1	3	1	1	3	5	7	7	7
20	2013/Aug/08	14253768.52	1029921.853	1	0	080813F1E3T	6.54E+14	2.8mph	RTK Fixed	Medium 0.1	3	1	1	3	5	7	7	7
21	2013/Aug/08	14253769.64	1029921.853	1	0	080813F1E3T	6.54E+14	3.8mph	RTK Fixed	Medium 0.1	3	1	1	3	5	7	7	7
22	2013/Aug/08	14253770.76	1029921.853	1	0	080813F1E3T	6.54E+14	2.8mph	RTK Fixed	Medium 0.1	3	1	1	3	5	7	7	7
23	2013/Aug/08	14253771.88	1029921.853	1	0	080813F1E3T	6.54E+14	1.8mph	RTK Fixed	Medium 0.1	3	1	1	3	5	7	7	7
24	2013/Aug/08	14253773.00	1029921.853	1	0	080813F1E3T	6.54E+14	2.8mph	RTK Fixed	Medium 0.1	3	1	1	3	5	7	7	7
25	2013/Aug/08	14253774.12	1029921.853	1	0	080813F1E3T	6.54E+14	3.8mph	RTK Fixed	Medium 0.1	3	1	1	3	5	7	7	7
26	2013/Aug/08	14253775.24	1029921.853	1	0	080813F1E3T	6.54E+14	2.8mph	RTK Fixed	Medium 0.1	3	1	1	3	5	7	7	7
27	2013/Aug/08	14253776.36	1029921.853	1	0	080813F1E3T	6.54E+14	1.8mph	RTK Fixed	Medium 0.1	3	1	1	3	5	7	7	7
28	2013/Aug/08	14253777.48	1029921.853	1	0	080813F1E3T	6.54E+14	2.8mph	RTK Fixed	Medium 0.1	3	1	1	3	5	7	7	7
29	2013/Aug/08	14253778.60	1029921.853	1	0	080813F1E3T	6.54E+14	3.8mph	RTK Fixed	Medium 0.1	3	1	1	3	5	7	7	7
30	2013/Aug/08	14253779.72	1029921.853	1	0	080813F1E3T	6.54E+14	2.8mph	RTK Fixed	Medium 0.1	3	1	1	3	5	7	7	7
31	2013/Aug/08	14253780.84	1029921.853	1	0	080813F1E3T	6.54E+14	1.8mph	RTK Fixed	Medium 0.1	3	1	1	3	5	7	7	7
32	2013/Aug/08	14253781.96	1029921.853	1	0	080813F1E3T	6.54E+14	2.8mph	RTK Fixed	Medium 0.1	3	1	1	3	5	7	7	7
33	2013/Aug/08	14253783.08	1029921.853	1	0	080813F1E3T	6.54E+14	3.8mph	RTK Fixed	Medium 0.1	3	1	1	3	5	7	7	7
34	2013/Aug/08	14253784.20	1029921.853	1	0	080813F1E3T	6.54E+14	2.8mph	RTK Fixed	Medium 0.1	3	1	1	3	5	7	7	7
35	2013/Aug/08	14253785.32	1029921.853	1	0	080813F1E3T	6.54E+14	1.8mph	RTK Fixed	Medium 0.1	3	1	1	3	5	7	7	7
36	2013/Aug/08	14253786.44	1029921.853	1	0	080813F1E3T	6.54E+14	2.8mph	RTK Fixed	Medium 0.1	3	1	1	3	5	7	7	7
37	2013/Aug/08	14253787.56	1029921.853	1	0	080813F1E3T	6.54E+14	3.8mph	RTK Fixed	Medium 0.1	3	1	1	3	5	7	7	7
38	2013/Aug/08	14253788.68	1029921.853	1	0	080813F1E3T	6.54E+14	2.8mph	RTK Fixed	Medium 0.1	3	1	1	3	5	7	7	7
39	2013/Aug/08	14253789.80	1029921.853	1	0	080813F1E3T	6.54E+14	1.8mph	RTK Fixed	Medium 0.1	3	1	1	3	5	7	7	7
40	2013/Aug/08	14253790.92	1029921.853	1	0	080813F1E3T	6.54E+14	2.8mph	RTK Fixed	Medium 0.1	3	1	1	3	5	7	7	7
41	2013/Aug/08	14253792.04	1029921.853	1	0	080813F1E3T	6.54E+14	3.8mph	RTK Fixed	Medium 0.1	3	1	1	3	5	7	7	7
42	2013/Aug/08	14253793.16	1029921.853	1	0	080813F1E3T	6.54E+14	2.8mph	RTK Fixed	Medium 0.1	3	1	1	3	5	7	7	7
43	2013/Aug/08	14253794.28	1029921.853	1	0	080813F1E3T	6.54E+14	1.8mph	RTK Fixed	Medium 0.1	3	1	1	3	5	7	7	7
44	2013/Aug/08	14253795.40	1029921.853	1	0	080813F1E3T	6.54E+14	2.8mph	RTK Fixed	Medium 0.1	3	1	1	3	5	7	7	7
45	2013/Aug/08	14253796.52	1029921.853	1	0	080813F1E3T	6.54E+14	3.8mph	RTK Fixed	Medium 0.1	3	1	1	3	5	7	7	7
46	2013/Aug/08	14253797.64	1029921.853	1	0	080813F1E3T	6.54E+14	2.8mph	RTK Fixed	Medium 0.1	3	1	1	3	5	7	7	7
47	2013/Aug/08	14253798.76	1029921.853	1	0	080813F1E3T	6.54E+14	1.8mph	RTK Fixed	Medium 0.1	3	1	1	3	5	7	7	7
48	2013/Aug/08	14253799.88	1029921.853	1	0	080813F1E3T	6.54E+14	2.8mph	RTK Fixed	Medium 0.1	3	1	1	3	5	7	7	7
49	2013/Aug/08	14253801.00	1029921.853	1	0	080813F1E3T	6.54E+14	3.8mph	RTK Fixed	Medium 0.1	3	1	1	3	5	7	7	7
50	2013/Aug/08	14253802.12	1029921.853	1	0	080813F1E3T	6.54E+14	2.8mph	RTK Fixed	Medium 0.1	3	1	1	3	5	7	7	7



VETA 4.0 Software (KYTC)



How is it set up in the field on a daily basis?

1. Setup GPS Base Station
2. Attach GPS antenna and display box to roller
3. Start machine
4. Check GPS connectivity – may require moving the roller back and forth
 - If the roller is mapping, GPS is connected
5. Verify the roller coordinates match rover coordinates (per spec)
6. Set target pass counts and target temperature ranges if different from previous day
7. Start a new map (depends on file naming convention) if required
8. Download data twice per day via USB (per spec) and e-mail to office

This can take anywhere from 5 to 15 minutes

Recommendations...

- Decide *in advance* on a File Naming convention for each day of paving
- Set the **TIME ZONE** on the roller so that it matches local time with file names
- Practice transferring data *before* the job starts and *who* is responsible
- Who will download data from the roller? Once per day? Twice per day (spec)?
- How will roller data get transferred to KYTC? Via USB in the field? By e-mail?
- Who will upload data to VisionLink?
- Who will export the “All Passes” data from VisionLink?
- Who will import the VisionLink data to VETA 4.0 software?
- **Have a list of phone numbers handy for GPS or machine issues**

Benefits of IC

- Information that is “actionable” in real-time on the job
- Operator – self-training and self-monitoring tool
- Uniform coverage = better density & better smoothness
- Transition zones - statistical pay factor specs PWL
- Night work
- Temperature monitoring
- Longitudinal joint overlap/joint density
- Identifying relative soft spots in base
- Documentation of 100% of job!!
- Reduced field testing = safety/cost



Summary: What IC can and cannot do

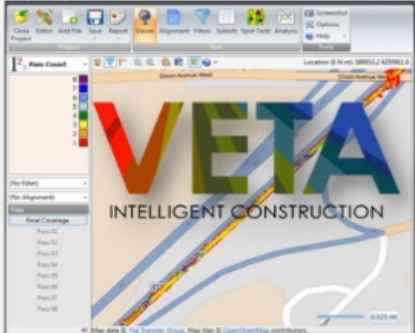


- Can record coverage (passes)
- Can record surface temperature
- Can identify “soft spots” at depth unknown
 - Can pre-map aggregate base
- Cannot measure density

CMV \neq Density

INTELLIGENT COMPACTION

One-stop shop for IC

LEARN IC VETA EQUIPMENT PROJECTS SUPPORT



MANY DATA SOURCES... ONE STANDARD TOOL

IC Support Veta Upgrade Learn IC in a Day Specifications

View helpful info and contact us for support at our IC Technical Support Service Center.

Download the latest version of Veta, the IC data management and analysis software.

Attend an IC workshop and learn how to use IC to ensure longer pavement lives.

View and download asphalt and soils IC specifications.

Intelligent Compaction News

[View all IC news →](#)

April 28th, 2016 Veta 4.0.110 Released

April 8th, 2016 Veta 4.0 Released

March 31st, 2016 IC Specs Are Updated

Import "All Passes" *.csv file to VEDA 4.0 software



- Data from VL must now be imported to VETA 4.0
- VETA is designed to accept all OEMs intelligent compaction data
- Process of exporting data from OEMs software and then into VETA is the same for all OEMs
- Working towards direct data transfer in the future

VETA 4.0 Overview

The screenshot displays the VETA 4.0 software interface. The title bar reads "Jurgensen_Test_May18 - Veta 4.0". The top menu bar includes "Project", "View", "Export", "Data", and "Alignment". The "Project" menu has options for "Project", "Add File", and "Report". The "View" menu has options for "View", "Export", "Data", and "Alignment". The "Data" menu has a "Filter Group" dropdown set to "(None)".

The main map area shows a road network with a red circle highlighting a segment labeled "43B". A text box within the circle says "No data is selected". A red arrow points from the "Individual Passes" legend to the "Pass 01" checkbox.

On the right side, there is a "Pass Count" legend with a color-coded scale from 1 to 8. Below it, there are radio buttons for "Final Coverage" and "Individual Passes". Under "Individual Passes", there are checkboxes for "Pass 01" through "Pass 06".

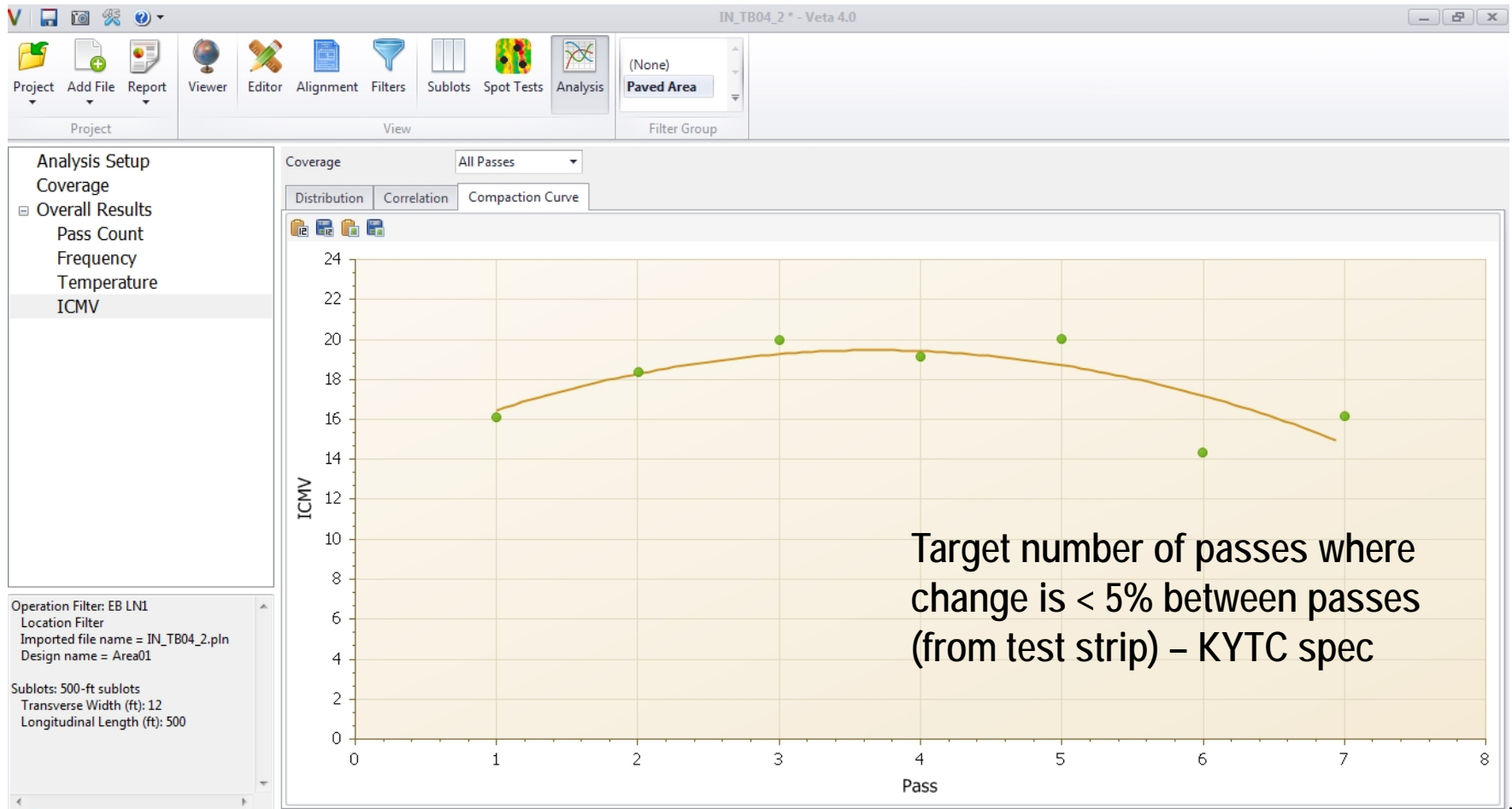
At the bottom, the status bar shows "Map data © The Transtec Group, Map tiles © OpenStreetMap contributors." and a taskbar with several open applications, including "Jurgensen_Test_May...", "IC Training.pptx - Po...", and "My Documents". The system clock shows "10:09 PM".

VETA 4.0 Overview

The screenshot displays the VETA 4.0 software interface. The title bar reads "Jurgensen_Test_May18 * - Veta 4.0". The interface includes a menu bar with options like Project, Add File, Report, Viewer, Editor, Alignment, Filters, Sublots, Spot Tests, and Analysis. Below the menu bar is a toolbar with icons for navigation and analysis. The main workspace shows a map of the Cincinnati By-Pass area, with roads labeled "Cincinnati By-Pass", "43B", "1275", and "44". A legend on the right side of the map shows a "Pass Count" scale from 1 to 8, with corresponding colors. A red circle highlights the legend and a list of passes: "Final Coverage", "Individual Passes", "Pass 01", "Pass 02", "Pass 03", "Pass 04", "Pass 05", and "Pass 06". The "Individual Passes" option is selected, and all passes are checked. The map also shows a scale bar for 100 meters and coordinates: Easting (m): 721567.4, Northing (m): 4351848.4. The bottom status bar shows the Windows taskbar with the time 10:09 PM.

Map data © The Transtec Group, Map tiles © OpenStreetMap contributors.

Create CMV Compaction Curve in VEDA 4.0 software



Import density data from test strip to VEDA 4.0 software

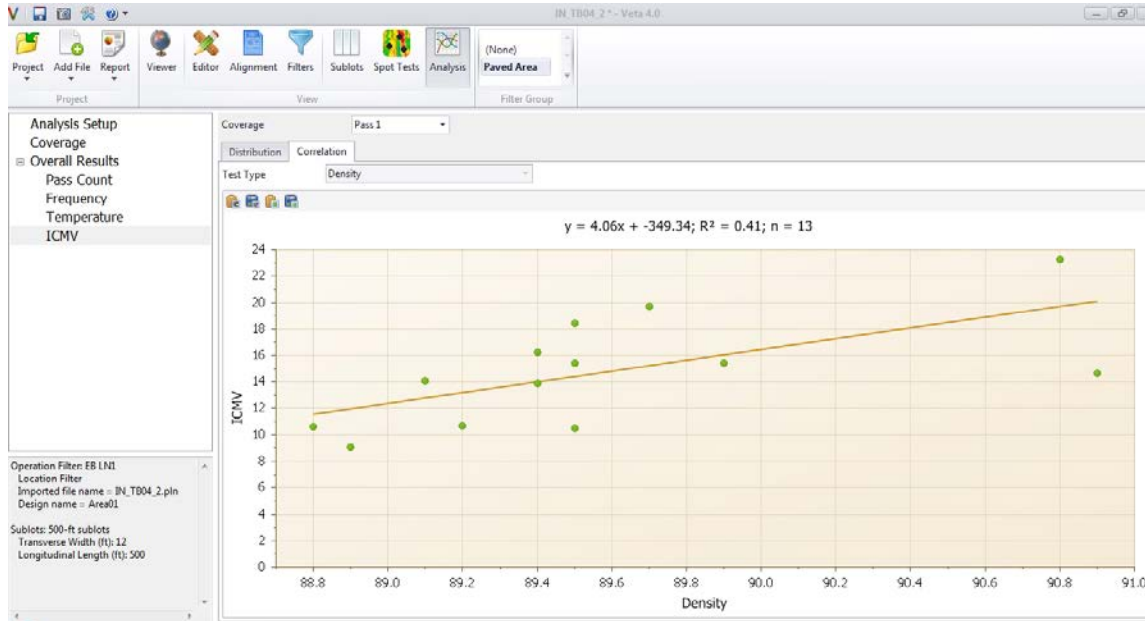
The screenshot displays the VEDA 4.0 software interface. The top toolbar includes icons for Project, Add File, Report, Viewer, Editor, Alignment, Filters, Sublots, Spot Tests, and Analysis. The 'Spot Tests' icon is highlighted. Below the toolbar, the 'File' menu is open, showing 'Pass 01' selected. The main data table is as follows:

ID	Date	Easting (m)	Northing (m)	Test Type	Value
N6-A	May 24, 2016 10:51 F	499203.813	4479954.904	Density	89.1
N6-B	May 24, 2016 10:51 F	499204.259	4479956.562	Density	89.4
N6-C	May 24, 2016 10:51 F	499204.386	4479958.391	Density	88.8
N7-B	May 24, 2016 10:51 F	499535.027	4479864.112	Density	89.9
N7-C	May 24, 2016 10:51 F	499535.207	4479865.836	Density	89.5
N8-A	May 24, 2016 10:51 F	499649.81	4479830.242	Density	89.4
N8-R	May 24, 2016 10:51 F	499650.307	4479831.753	Density	90.9

Below the table, the map view shows a road labeled 'Sagamore Pkwy' with a red line indicating the test strip location. A legend on the right side of the map shows a color scale for 'Pass Count' from 1 to 8. The map also displays coordinates: Easting (m): 499919.7, Northing (m): 4480000.9. A scale bar at the bottom right indicates 200 meters.

Map data © The Transtec Group, Map tiles © OpenStreetMap contributors.

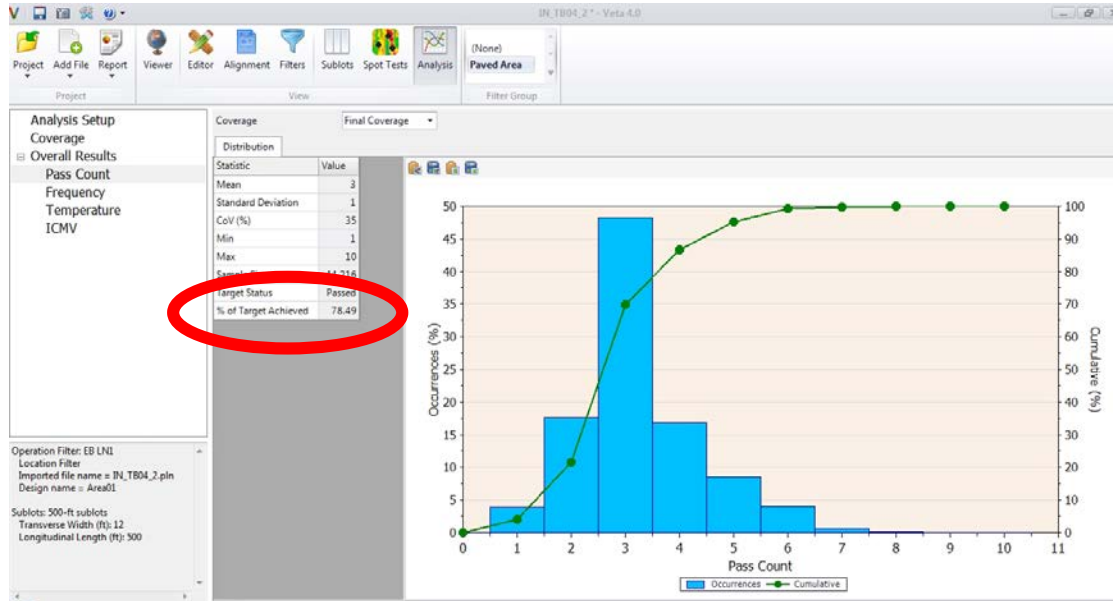
VETA 4.0 CMV Target Value



- Use imported core or density gauge data to correlate with CMV readings
- VETA plots a correlation between density and CMV
- Requires location of cores/density gauge readings

ID	Northing	Easting	Test Type	Value
N6-A	4479955	499203.8	Density	89.1
N6-B	4479957	499204.3	Density	89.4
N6-C	4479958	499204.4	Density	88.8
N7-B	4479864	499535	Density	89.9
N7-C	4479866	499535.2	Density	89.5
N8-A	4479830	499649.8	Density	89.4
N8-B	4479832	499650.3	Density	90.9
N8-C	4479834	499651	Density	88.9
N9-A	4479786	499817.5	Density	89.5
N9-B	4479788	499818.1	Density	89.5
N9-C	4479790	499818.9	Density	89.2
N10-A	4479744	500009.2	Density	90.8
N10-B	4479747	500009.6	Density	89.7

Determining % Coverage



- 80% coverage of the Construction Area required by spec

- % Coverage can be determined by:

1. Creating Filters in VETA
2. Manually trimming data in VL before exporting
3. Having roller operator manually turn mapping "on" or "off" when he/she leaves the 'IC Area'

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MARCH 2017

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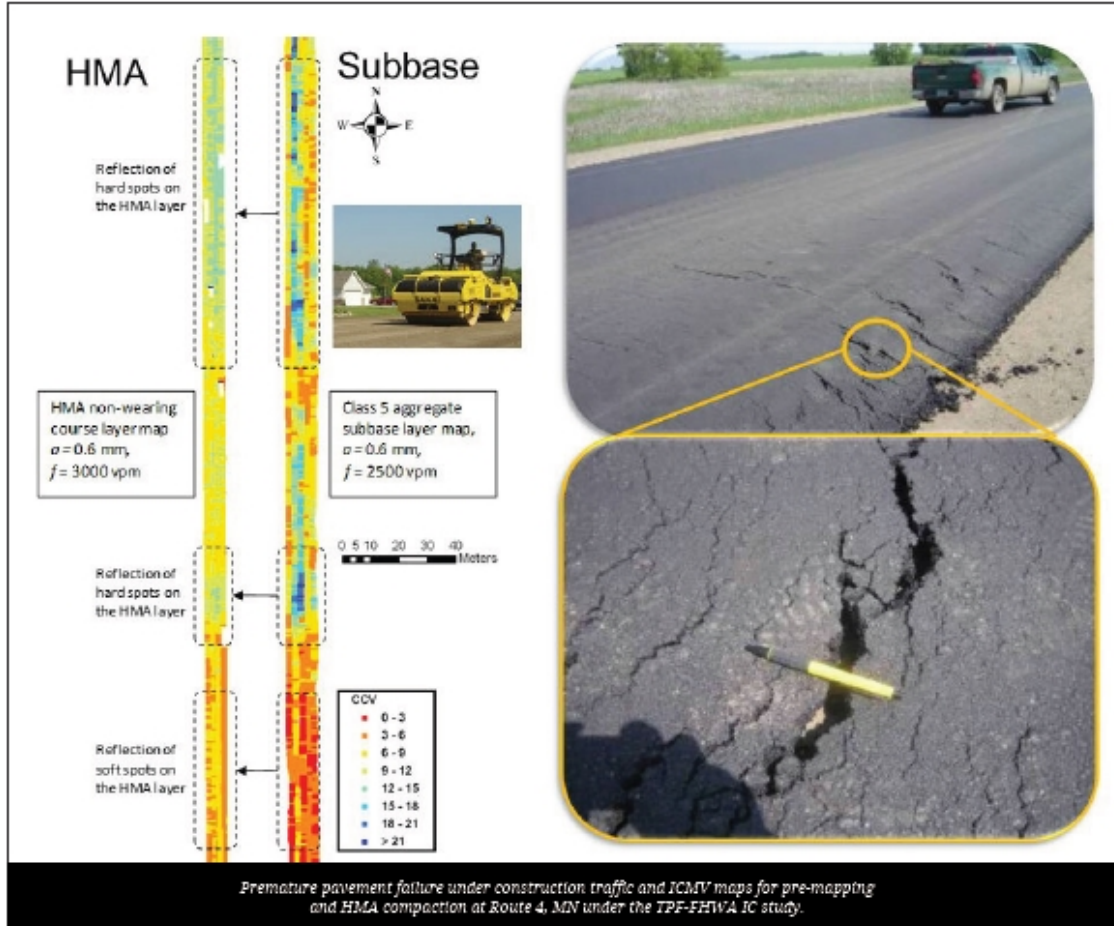
Materials and specifications are subject to change without notice.

Featured machines in photography may include additional equipment for special applications.

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Pre-Mapping and Paving



Strongly recommend reading this document!!

TECHNICAL BRIEF

U.S. Department of Transportation
Federal Highway Administration

DEFINITION OF PRE-MAPPING

Pre-mapping is defined as measuring base line stiffness of existing support materials using an ICMV. The ICMV measurement value (ICMV) system is used to estimate stiffness based on acceleration signals caused by roller drum rebound.

The pre-mapping ICMV and its measurement depth—typically 3 to 5 feet—depend on the roller type, weight, drum diameter, vibration frequency and amplitude, speed, direction of travel, and the stiffness of the mapped materials.

Candidate support materials for pre-mapping include granular fill depth, stabilization materials or their equivalent. Typically, the ICMV machines used to pre-map existing pavement subgrade structural support are the same as those used to construct subsequent layers. In order to prevent “double pump” during pre-mapping, the ICMV machine settings (including speed, vibration frequency, and amplitude) must be carefully selected.

With ICMV, teams can identify soft spots during construction and make corrective actions. If the soft spot was caused by excess moisture in the soil, the materials can be diked and dried out before recompaction. If the soft spot occurred due to insufficient moisture, water can be added to the materials before recompaction.

INTELLIGENT COMPACTION FOR PRE-MAPPING

TECHNICAL BRIEF

A white double drum ICMV roller pre-mapping the granular base of Route 4, MN under the TPF-FHWA IC study.

BACKGROUND

Intelligent compaction (IC) is an equipment based technology to improve quality control of compaction. IC vibratory rollers are equipped with a high precision global positioning system (GPS), infrared temperature sensor, an accelerometer-based measurement system, and an onboard color-coded display. IC has been used to improve compaction control for various pavement materials including granular and clayey soils, subbase materials, and asphalt materials.

Pre-mapping originated as a research activity on the 2008 FHWA TPF IC project in Minnesota. The project team used a white double drum ICMV roller to measure the baseline support condition by mapping subgrade materials at low vibration frequency and amplitude prior to the asphalt layer construction on Route 4. Later during paving, construction traffic caused the asphalt layer to fail prematurely. A soft spot had occurred—and the team later realized they could identify the soft spot in the pre-mapping data. Due to this discovery, the industry now recognizes the value of pre-mapping: the data collected by pre-mapping can help construction teams identify potential soft spots before pavement failure.

As of today, several state departments of transportation (DOT) IC specifications include pre-mapping as an option or requirement. This brief intends to provide the best available technical information regarding pre-mapping in order to clarify its advantages and limitations.