Speakers Bios and Topic Abstracts

Opening Remarks

Phillip Ditzler
FHWA

Bio

In July 2007, Phillip Ditzler was appointed the Federal Highway Administration's (FHWA) Oregon Division Administrator, serving as the principal representative of the FHWA in Oregon and responsible for administering the Federal-aid Highway Program in the State. Phillip heads the statewide office, providing leadership and guidance to State and local officials in planning and setting priorities for carrying out State and national transportation program goals. Phillip began his career with FHWA in 1984 as a summer intern on highway construction projects in the Pacific Northwest. Since that time, Phillip has held a wide range of positions with FHWA in both field and headquarters units. Phillip holds a bachelor's degree in Civil Engineering from the University of Washington, and is licensed as a Professional Engineer in the states of Washington and South Dakota.

Engineering Automation – Key Concepts

Ron Singh
ODOT

Bio

Ron Singh is the Chief of Surveys and Geometronics Manager for the Oregon Department of Transportation. He directs the agency's surveying program which includes surveys for Project Development; Construction; Monumentation; Photogrammetry; Geodetic Control; and Right-of-Way Engineering.

Ron has been in a leadership role with transportation engineering automation for over 25 years; he has served on various committees relating to intelligent construction systems and technologies for the Federal Highway Administration, Transportation Research Board, and the National Academy of Sciences. He is a member of the Professional Land Surveyors of Oregon, the National Society of Professional Surveyors, and the American Society of Civil Engineers - Geomatics Division.

Ron currently serves on the Oregon State Board of Examiners for Engineering and Land Surveying.

Ron has been with the Department for 37 years.

Abstract

It doesn't take much of an imagination to envision intelligent vehicles plying intelligent highways in the future with significantly improved safety, economy, energy efficiency, and impact to the environment. Although it is nearly impossible to determine the actual transportation related technologies that will exist 25 years from now; we can say with certainty, that certain key concepts and components will be part of the development of that vision.

This presentation is based on a paper titled *"Engineering Automation, Key Concepts for a 25-year Time Horizon"* which proposed that a long range Engineering Automation Plan be developed and implemented at ODOT. It describes key concepts that should be included in the Agency's future automation plans. It also illustrates the connectivity of these key concepts, which is vital to the success of a well thought out overall engineering automation plan.

Utilities – The Forgotten Problem

Donald W. Haines
Utility Mapping Services

Bio

Don has been with UMS for two years, where he has worked on integrating emerging technology in all aspects of Subsurface Utility Engineering (SUE) data acquisition and processing. He is currently involved in projects in Washington, Iowa, South Dakota, Montana, Minnesota and Wisconsin, and is leading a project in South Dakota integrating the latest Utility Infrastructure Management tool developed by UMS. Don is a member of the ASCE "Utility As-built Standard" Committee looking at the best procedures to capture data on newly installed utilities.

Prior to joining UMS, he was with the National Oceanic and Atmospheric Administration (NOAA) for 24 years, where he served in the leadership cadre for hydrographic data acquisition and processing, and nautical chart production. His NOAA experience included: evolving the paper/analog processing method into a fully automated digital process; creating and setting national standards for hydrographic acquisition and processing; and developing a national data acquisition plan and tracking system for over $50M in annual funding.

Don Haines graduated from Michigan Technological University in 1987 with a B.S. in Mechanical Engineering.

Abstract

Buried throughout our public corridors and private easements, a myriad of silent, inconspicuous conduits transfer billions of bytes, gallons, kilowatts, and BTUs of vital goods and services to our nation's demanding and dependent industries, businesses, government agencies, and public citizens. Consequently, construction activities which can disrupt utility infrastructure pose extreme high risk to all involved in the form of delays, change orders, hand digging, damage, service disruptions (which can shut down dependent businesses), injury, loss of life, emergency adjustments and relocations, and corresponding litigation. This risk, unmitigated, comes with a hefty price tag often assessed during a project's construction stage at taxpayer and ratepayer (i.e., public) expense. Nonetheless old habits persist and utility infrastructure continues to be casually addressed and managed in a non-professional manner, with non-rigorous practices and data standards woefully adequate for today's advanced digital design and construction tools.

However, state-of-the-art subsurface utility engineering (SUE) practices include 3-D data acquisition and management, 3D infrastructure modeling and visualization, 3D clash detection, sophisticated conflict analysis and resolution engineering, proactive utility coordination and agreement preparation, and innovative contracting which enable superior design and construction that mitigates risk while promoting value engineering solutions that often: 1) allow infrastructure to remain safely in place, and 2) integrate required utility work into the mainline construction effort.

3D data acquisition technologies include geophysical equipment integrated with global navigation satellite system (GNSS), such as the SPR 300 electromagnetic (EM) locator and Noggin Plus ground penetrating radar (GPR), which tie observations in real-time to project survey control networks. 3D data acquisition methods also include strategically placed vacuum excavated test holes and measure-down observations at valve, manhole and drain inlet and outfall access points. These data, after careful processing and analysis by qualified professionals, can be incorporated into the newest 3D utility modeling and design software, such as Bentley's SUE application, and ultimately included into machine control data systems to expedite construction and enable sound damage prevention practices.

Sophisticated 3D methods, however, must be paired with a higher standard of care. The presentation will discuss the latest technologies, methodologies, documentation standards, qualifications, and associated pitfalls that accompany 3D data acquisition, depiction, analysis and leveraging of utility data.

Surveying in Support of 3D Design and AMG

Ron Singh
ODOT

Bio

See above for photo and bio.

Abstract

Surveying is an integral part of transportation engineering and plays a vital role for successful 3D design and automated machine guidance during construction. This topic will discuss various elements of a pre-design survey that must be taken into consideration to ensure accurate and reliable mapping for 3D design and a pre-construction survey to ensure successful machine guidance during construction. This topic will also briefly discuss post-construction surveys to replace typical as-built plans and to enable the development of digital transportation infrastructure.

3D Design and the Digital Data Package

David Arena
ODOT

Bio

Dave is a construction designer, surveyor and senior inspector with the Oregon Department of Transportation in the Region 1 construction office. Currently, Dave is on rotation as a Local Agency Liaison in the Region 1 Tech Center and brings a great deal of project development and field experience. During his time in the field, Dave has worked on several large construction projects utilizing AMG including the MLK Viaduct in Portland, I-5 Interchange in Wilsonville, OR217 widening in Beaverton and the Sunrise Corridor project in Portland. Dave earned his BS in Civil Engineering from the University of Maine and is a licensed professional engineer in Oregon and Washington.

Abstract

Contractors who construct ODOT's highways and Local Agency roads are increasingly using machine control equipment in order to provide more cost-efficient projects. An important prerequisite for many of these new tools and methods is a complete and accurate digital design package prior to construction. This digital design package is extremely beneficial in the contractor's bid development, in constructing and administering of the contract, in quality assurance and in control of the deliverables. ODOT has included 3D roadway design as Chapter 16 of the Oregon Highway Design Manual (HDM) as well as supplemental resources related to 3D roadway design in Appendix M and Appendix N.

Automated Machine Guidance and their "D"imensions

Brian Girouard
Trimble Navigation

Bio

Brian E Girouard is a Trimble Sales Engineer and the Milling-Paving-Compaction Specialist for the Americas Heavy Civil Construction Division and has approx 15 years of 3D machine control experience. Brian has an Honors Diploma in Civil Engineering Technology from Red River College in Winnipeg Manitoba Canada. He has been employed with Trimble for over 11 years as a Sales Engineer focusing on 3D Machine Control field applications. Prior to joining Trimble, Brian worked in Technical Sales and Sales Management for the Construction & Civil/Survey Engineering Industries between Canada and the US for approx 7 yrs. Brian has experience in Civil/Survey Engineering and began using Trimble Survey and Mapping GPS Products in 1994.

Abstract

This is an introductory session that explains Automated Machine Guidance and the difference between 1D, 2D and 3D Machine Control Systems. Attendees will learn the difference in using a single plane laser for elevation (1D), elevation and slope (2D) and full horizontal and vertical (3D) machine control systems. We will also discuss GNSS, Laser Augmentation GNSS and Universal Robotic Total Stations and the accuracies expected on your project. Attendees will understand the difference between technologies used for machine control systems and what is required to achieve the project specifications.

Intelligent Compaction – State of the Technology

Antonio Nieves Torres
FHWA

Bio

- Graduated from the Polytechnic University of Puerto Rico in 1985 where he also served as professor in this institution.
- More than 29 years of professional experience in several engineering areas highway design, drainage design, concrete/asphalt pavements.
- He has worked in several positions in FHWA among them National Institute of Highways, Research Engineer for the Long Term Pavement Performance Program (LTPP).
- Worked with both concrete and asphalt teams in FHWA
- Served as the Executive Director of the Pan-American Institute of Highways (PIH) where a number of other technology transfer programs for Latin America were developed.
- Currently working with FHWA Construction Management Team where he is working on the implementation efforts of the agency in Intelligent Construction Systems and Technology ICST).
- Also serves as the FHWA national team lead in the implementation of Intelligent Compaction under the Everyday Counts 2 initiative (EDC-2).

Abstract

Intelligent Compaction (IC) refers to the compaction of road materials, such as soils, aggregate bases, and/or asphalt pavement materials, using modern vibratory rollers equipped with an integrated measurement system (high precision positioning systems, accelerometers, and onboard computer reporting system) that provide real-time feedback to the roller operator during the entire compaction process. IC rollers maintain a continuous record of compaction using color-coded plots and collect data from the compaction process such as number of passes, stiffness values, temperature (asphalt), frequencies, amplitude, and roller speed as well as location information of the roller. Achieving compaction consistently and uniformly is extremely important. Current processes using conventional compaction machines may result in inadequate and/or non-uniform material compaction, which can be one of the major factors that can result in premature pavement failures. Intelligent Compaction helps to overcome this limitation.

The presentation will cover the basics of "What is Intelligent Compaction?", and how it is defined by the Federal Highway Administration (FHWA). What components are necessary for the successfully implement this technology? What are the advantages and disadvantaged of using the technology? What are the High Precision Positioning Systems (HPPS) options available? How can IC be used as an effective quality control tool?, the data analyzes options available (VEDA), and finally the presentation will discuss national implementation practices and how everyone can benefit from what other people are doing with their IC implementation.

Participants will receive information on Intelligent Compaction, its' use, practices, and how FHWA can assist them in implementing IC.

Concrete Paving, Curbs and Walls

Kelly Steeves
Leica Geosystems

Bio

Kelly Steeves is the Paving Account Manager for Leica Geosystems, a manufacturer of global geospatial positioning products. With over 21 years of concrete construction experience, He began his career as a laborer for Suchor Concrete Construction in Wyoming then becoming a superintendent and estimator during his 15 years with the company. Kelly was a board member of the Concrete Association of Wyoming and President of the Concrete Association of Wyoming in 2005.

Kelly moved on to Concrete Placing Company in Boise, Idaho as a paving superintendent. In 2010 he joined R.L. Wadsworth a Joint Venture partner of Provo River Constructors serving as the Concrete Paving Manager for the I-15 Core Project in Utah, an extensive three-year, 1.5 Billion dollar highway reconstruction job that rebuilt 24 miles of the state's largest travelled corridors.

Abstract

One public verdict that concrete highway projects are judged on daily is the ride-ability of the finished product. Many factors go into providing that finished product, and controlling the variables increases our chances of being judged favorably. Through the use of the most accurate positioning sensors and systems, concrete paving surfaces and structures are today positioned by engineering and technology rather than the "Eye Ball" and the string. From your typical standard curb to barrier walls to multi- lane mainline roadways, String Less Machine Control Paving Technology allows highway projects to increase worker and public safety during construction, interrupt the flow of existing traffic less, and provides a reliable engineered method to do so. The result is less cost and ride results that are predictable and verifiable.

Construction Inspection Issues

Douglas Townes
FHWA

Bio

Douglas Townes is a Professional Engineer with the Federal Highway's Resource Center on the Construction and Project Management Team.

Douglas served as the FHWA's representative on AASHTO's Technology Implementation Group (TIG) that was tasked with promoting Automated Machine Guidance. Douglas was the FHWA's representative on the NCHRP 10-77 project "Developing Guidelines for GPS Controlled Construction Machine Guidance and Required Software". Douglas is currently the facilitator along with Francesca Maier for the FHWA's webinar series on 3D Modeling.

Abstract

Automated Machine Guidance (AMG) enables many aspects of transportation construction to be performed without (or significantly reduced) survey staking. There are many benefits to using AMG construction processes, however it impacts the construction inspector's abilities to check line, grade, and position of the feature being built. This topic will discuss the requirement to measure pay quantities accurately and independently and suggest ways to accomplish that task.

Basic Concepts of Stringless Asphalt Paving

Kevin Garcia
Trimble Navigation

Bio

Kevin Garcia is the Road and Paving Construction Segment Manager at Trimble, part of the Heavy Civil Construction Division. Kevin graduated the University of Wyoming with a BA in Civil Engineering and began his career working in the construction materials industry. He spent his first 8 years post grad working in the cement manufacturing industry before moving to asphalt manufacturing. Prior to Trimble, Kevin was the Director of Performance for the Paving and Asphalt Division at Lafarge, a large construction materials company.

Abstract

This is an introductory session to Stringless (3D) Asphalt paving. Attendees will be instructed on the components that comprise a 3D paving system and the purpose for each sensor type. We will also discuss the varying methods for providing positioning to the system, allowing the paver to follow a 3D model. Lastly, we'll discuss what information is needed to adequately and accurately prepare a model for 3D guidance and what considerations are needed during the model creation. Attendees should expect a basic understanding of 3D paver positioning and how these same techniques can apply to other machine types including milling and grading machines.

Milling to a Profile

Kevin Murphy
Leica Geosystems

Bio

Kevin is the Western Regional Manager for Machine Control and Positioning System for Leica Geosystem, Inc. Kevin has 30 years in the construction and civil engineering field across the western United States. He spent 20 years in land surveying, civil engineering and construction management specializing in bridge and highway construction before entering into Machine Control in 2004. Kevin joined Leica Geosystems in 2009 and is responsible for direct and distribution sales channels for the Machine Control Division of Leica in North America. Kevin and his wife of 25 years, Patty, live in Southern California.

Abstract

For around 20 years now, the construction industry has achieved significant gains in quality and production through the use of machine control technology. Now, with additional technology advancements by the manufacturers of milling machines, those gains can be achieved for significant gains in safety, productivity, scheduling and smoothness of our asphalt and concrete road construction projects. Using good design data and constructing with Robotic Total Station Guidance, we can remove the old technology of sonic sensors and ignore existing surface undulations to mill to a fine 3D Profile and accurately Re Surface on top of that exact profile. The result is a project with tighter quantities, shorter paving schedules and a longer lasting, better riding finished surface.