R.E. WARNER
& ASSOCIATES INC.

ENGINEERS
ARCHITECTS
SURVEYORS
CONSTRUCTION MANAGERS

# Excellence BY DESIGN

SUMMER 2018

A DIGITAL MAGAZINE FOR CLIENTS AND FRIENDS OF R.E. WARNER & ASSOCIATES, INC.

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**ON THE COVER:** 3D SCANNING COORDINATOR DAVE ANDREWS PRODUCES 3D MODEL OF OBJECT FOR CONFIDENTIAL CLIENT

# PRESIDENT'S MESSAGE

by Ted Beltavski, PE, MS

## *PRECISION MEASUREMENT & MODELING*

***High-tech tools have many uses; provide better solutions***

One of the things we were most excited about upon acquiring Accurate Technologies in March 2016 was the ability to integrate the 3D laser scanning, laser tracking and aerial mapping technologies into our engineering, architecture and surveying projects.

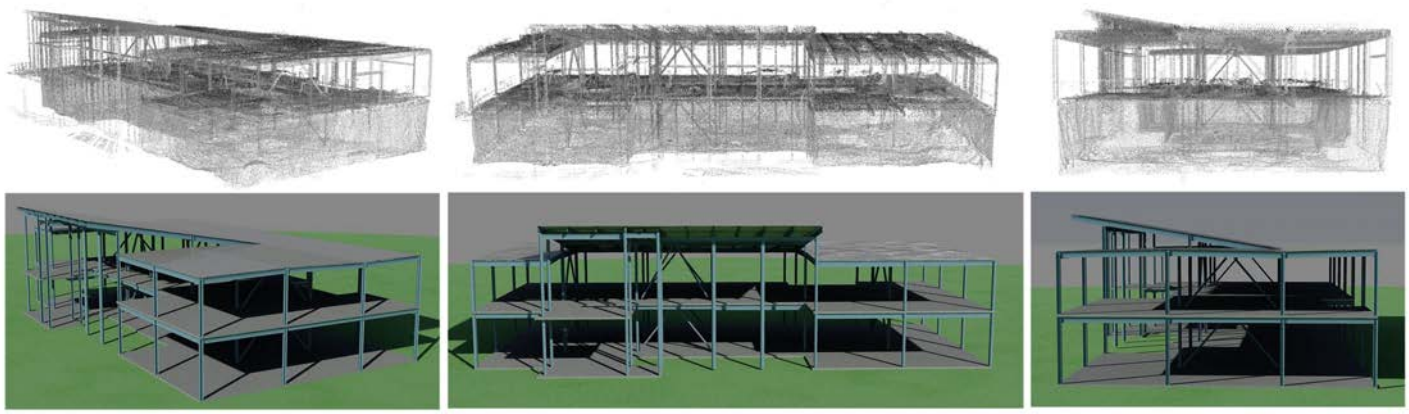
As time has gone on, these have proved to be versatile tools that provide value to clients across many markets, whether utilized as a stand-alone service or integrated into multi-faceted scopes.

This issue's feature story – *Focus On: 3D Laser Scanning* – looks specifically at the work of 3D Scanning Coordinator Dave Andrews. Dave conducted over 370 scans in July alone, resulting in nearly one terabyte of data. In this feature, we look at several different projects and the reasons for performing them, illustrating the versatility of this technology.

What's even more exciting, is that 3D laser scanning, 3D laser tracking, and aerial mapping are still new enough technologies that our team is constantly imagining new ways to help our clients through their use. Just the other day, I listened in on a discussion about how we can help counties obtain better data about the structural integrity of bridges. Incredible!

Very few multi-discipline engineering firms have integrated these technologies into their abilities. We are proud to be uniquely able to provide new solutions that better serve our clients.

# FOCUS ON: 3D LASER SCANNING



R.E. Warner's 3D Scanning Coordinator Dave Andrews has been very busy this year. In July alone he conducted 350 scans resulting in nearly a terabyte of data. His recent work has even taken him overseas.

Here's a look at several recent projects, each demonstrating the various ways clients are benefitting from 3D scanning.

**Merging Record Status Data with 3D Design Data:**
One recent project involved merging 3D record status data with 3D design data. We scanned and modeled existing duct work at a steel plant, then took new designs and merged them with the the model depicting the existing facilities. Designers were then able to do the layout of the new designs all from the scans. Because of the quality of design, construction went smoothly without delays or changes.

**Connecting Columns Lines of Two Buildings for Manufacturing Plant Expansion:**
Dave performed 3D laser scanning of two buildings a manufacturing client is planning to connect at their plant in Slovenia. The 3D scan of the facilities and equipment accurately portrays the areas in order to move forward with design by connecting the centerline of columns.

Often our industrial clients' construction drawings have not been updated to reflect minor changes made to a facility over time. In addition, such drawings would not account for building movement/settlement. 3D scanning depicts EVERYTHING in view of the scanner to an accuracy of +/- 2mm, which is critical to the success of a project such as this.

Dave also performed a field survey for this client upon finding out that the owner did not have existing survey data to be able to verify the 3D scans' location of the column lines of the two buildings. The client needs to have survey work to tie the buildings together and provide a good form of base control for the project once construction starts. The field survey provides a coordinate system for the project and provides a direct link to the buildings.

Fortunately, Dave has the knowledge and experience to be able to provide record status surveys – what could have caused a major delay ended up being just several extra hours of field work.

**Assessing Equipment Damage:**
Another client called us to document an overhead crane damaged in a wind storm. The 3D model of the damage helped engineers determine the extent of repairs needed.

**Documentation of Installation Failures:**
The Holmes County Engineer office asked Dave to scan a set of faigrounds bleachers that were installed incorrectly in order to document structural failures.While the contractor had agreed to remove the bleachers, the county engineer wanted the installation documented in case legal issues would arise.

**Equipment Installation Verification:**
Our team performed a 3D scan in connection with the replacement of a BOF vessel at a steel plant. We performed 3D scanning of the piece of equipment as well as the area of the plant where the new vessel was to be installed. Following, we registered the scan data, pulling specified data, and creating a partial 3D model. These results were coordinated with scan of the caster to verify the fit.

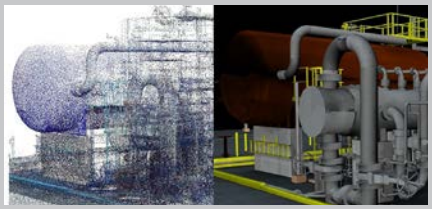
**New Water Main Layout**
Dave performed 3D laser scanning of the utilities and structural steel along the path of a proposed new water main at a steel plant. The proposed water main is over 700 feet long and its construction would involve removing existing utilities to make way for the new piping.

Our deliverable was a partial 3D model of the major structural steel members and utilities along the described path. This model allowed steel plant personnel to lay out the new water main in a digital representation of the existing environment.

*For more information about our 3D scanning capabilities, contact Dave Andrews .*

**How can we help you?**
Dave and the rest of our team are constantly thinking of new ways this technology can help our clients. To see if this service can benefit your project or get more information about these capabilities, contact Dave or call our office at 440-835-9400.

## SURVEY TO DELIVERABLE IN 4 STEPS:



**Survey Control:** Traverse points are established on site prior to scanning. These control points allow for scans to be pieced together accurately and placed onto a new or existing plant coordinate system and elevation.

**Laser Scanning:** This is the data collection step. Depending on the size and complexity of the project, multiple scans will be performed, with each related to the control points.

**Registration:** Once the data is downloaded, the scans are pieced together while referencing control points to ensure accuracy.

**Model Creation:** Using the billions of points from the scan, a 3D model can be created and used for documentation, verification, or calculations depending on the deliverable requested.

**Various Applications:**
- Industrial Applications
- Building Information Modeling (BIM)
- Emergency Building Mapping
- Volumetric Surveys
- Record Status Documentation
- Historic Preservation

# WHAT WE'RE WORKING ON

## METALS MARKET

### ENGINEERING SERVICES FOR MELT SHOP OPTIMIZATION

Our team is providing **engineering services in conjunction with Gerdau Special Steel's melt shop optimization, including high voltage yard upgrades**, at its Monroe, MI plant. Our tasks have included:

- High voltage yard modifications preliminary study followed by structural, civil and electrical engineering for the upgrades
- Detailed design architecture and engineering (civil, structural, mechanical and electrical) for the melt shop ladle maintenance building addition, plus geotechnical scope specifications
- 3D scanning of existing conditions to aid design work such as allowing equipment vendors to confirm dimensions
- 3D modeling to overlay LMF and EAF vendor equipment models to identify interferences/other installation issues

### ALUMINUM CHIP STORAGE BUILDING ADDITION

R.E. Warner is providing **multi-discipline A/E services for an industrial services provider's 20,000-sq.-ft. aluminum chip storage building addition**. The new property will house chip for an aluminum products company and include shipping/receiving with a restroom and break room. Our objectives are to: determine the best layout and systems for shipping, receiving and material handling; provide a stout free spanning building for movement of chip in the building including wall plate for piling chip and bollards to protect against building impact; and provide a building that is flexible enough to be easily converted for other use in the future. R.E. Warner is providing drawings and design for architectural, structural, civil, mechanical, piping, HVAC and electrical disciplines.

### STEEL PLANT POWERHOUSE NEW CONDUIT BANK

R.E. Warner is providing civil/survey, electrical, and structural **design engineering services to support a new concrete encased conduit duct bank** from a steel plant's substation to its powerhouse plus cable tray design inside the powerhouse. Our work includes civil/survey, electrical, and structural engineering services.

### ROLLING MILL INSTALLATION ENGINEERING

Civil, structural and MEP **engineering services in preparation for the installation and commissioning of a new rolling mill and other equipment** in connection with a forge press shop building expansion and a PC facility improvement project at a producer of titanium and engineered products' Martinsville Virginia Plant. R.E. Warner was the engineer of record of the single-story metal building constructed in 2009.

## POWER MARKET

### FIRSTENERGY SUBSTATION IMPROVEMENTS

FirstEnergy is purchasing several substations from municipalities in Northeast Ohio and subsequently making improvements to the substations' equipment and instrumentation to align with its corporate standards.

For the current phase of the project, R.E. Warner is providing **electrical engineering services to upgrade select equipment for connection to the existing SCADA system**.

### CLEVELAND PUBLIC POWER FINANCIAL PLAN DEVELOPMENT

R.E. Warner is **part of the team that has been selected to complete a financial study and analyses** in order to develop Cleveland Public Power's schedule of Rates, Fees and Charges covering year's 2019 through 2023. The Cost of Service Study and subsequent rate design development process is intended to provide justifiable and equitable methodologies for appropriate user fees that are adequate to fully fund the expenses associated with the power system, including operating and capital costs.

R.E. Warner's role is to provide electrical engineering services.

## CHEMICAL PROCESS MARKET

### SALT ADDITIVE AND STORAGE SYSTEM EXPANSION AND UPGRADE

R.E. Warner is providing **engineering services in connection with the expansion and upgrade of a a salt additive and storage system** at a salt mining company's facility. The new unloading system will be connected via piping from the salt loading shed to new tanks near existing storage tanks. Our team is providing drawings and specifications for structural, piping and electrical disciplines.

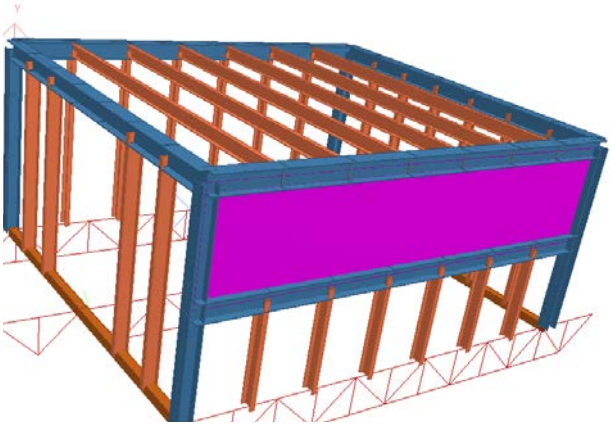
### PROBABLE COST STUDY FOR A NEW PRODUCTION LINE AT A PERFORMANCE MATERIALS PRODUCTION PLANT

Preparation of a comprehensive report of probable cost for a proposed new paste production line in an existing plant for a performance materials producer. R.E. Warner will also prepare a conceptual layout to aid in development of opinion of cost for the new facility.

## AUTO & MANUFACTURING MARKET

### VINYL PRODUCT EXTRUSION PLANT RETROFIT

Uhl Construction Company has partnered with R.E. Warner to assist an extruder of uPVC profiles used for windows and doors with **completing a building retrofit at its existing plant** in North Carolina. The new plant will house 17 extrusion lines for vinyl product extrusion. The facility will use the existing offices, HVAC, lighting and other systems. The existing Varco Pruden pre-engineered metal building will be built out with the new process including process lines, piping, sump pit and trenches.



R.E. Warner is providing architecture and structural engineering services.

### AUTO ASSEMBLY PLANT WWTP UPGRADES

Plant personnel are **reestablishing treatment with a sulfuric acid supply system at an auto assembly plant's wastewater treatment plant** that has been out of service. They have also commissioned upgrades to it to promote safe transfer while reducing handling and maintenance issues.

R.E. Warner is providing the necessary engineering to upgrade the WWTP sulfuric acid delivery system, including preparing drawings, specifications, and bill of materials including pipe supports, valves, etc. as needed to allow the client to purchase and install a working system. We will then revise drawings per field mark-ups to provide final record status drawings.

### CONFIDENTIAL MANUFACTURING FACILITY RENOVATION

The Austin Company has partnered with R.E. Warner & Associates, Inc. to assist in the **development of detailed design drawings for a renovated manufacturing space** in Kansas City, Kansas for a confidential client. To fulfill the scope of services, R.E. Warner will provide civil, architectural, structural, electrical and mechanical drawings for review, permitting and construction.

### AUTO PLANT MONORAIL STRUCTURAL STEEL SYSTEM INSTALLATION

Leadec Industrial Services hired R.E. Warner to **support its installation of a structural steel system and associated support steel for an existing conveyor system** that lifts 1500 kg components at an auto plant in the Southern U.S.

Our scope of work is to provide structural engineering for the structural steel system and steel support drawings for fabrication and erection of steel, structural specifications, and analysis of the existing roof trusses to ensure they are able to withstand the load from the proposed monorail lifts.

### NEW CONTAINER YARDS CONSTRUCTION

R.E. Warner is providing **professional services for the construction of new container yards** to accommodate 107 new spaces at an auto manufacturing plant in Central Ohio. Our scope of work includes: topographic survey and boring samples for the selected areas; demolition drawings; layout, pavement and drainage design; lighting design and drawings; and construction support and record status.

## GOVERNMENT MARKET

### LMHA PARKING DECK REPAIRS

Lorain Metropolitan Housing Authority has awarded R.E. Warner a contract for **full A/E services to inspect and design repairs for the existing parking deck** at Albright Terrace.

R.E. Warner was the engineer of record for mitigating the structural instability and repairs to this structure in 2009. This project includes field investigation through to construction administration and completion of maintenance repairs. Our scope of work includes inspection and repairs to the underground bank, pillars and deck foundation; deck structural members and support; and the parking deck concrete surface coating and deck fencing and storm sewer system.

### RED HILL RESERVOIR CHLORINE METERING SYSTEM INSTALL

R.E. Warner is providing **Engineering services to install a chlorine metering and recording system** at the Red Hill Reservoir.

This project will provide a more efficient method to supply chlorine to the system and record the dosage to meet OEPA requirements.

### TASK ORDERS FOR CLEVELAND ON-CALL A/E SERVICES CONTRACT

R.E. Warner is providing **multi-discipline engineering, architecture and surveying services for a variety of task orders r**equested under a City of Cleveland IDIQ professional services contract.

Recent projects have included services for the renovation of a parking lot in a busy Westpark neighborhood that is being revitalized. Our team also completed assessments for several aging roofs at the City's recrecation centers as well as an investigation of flooding at Loew park followed by a recomendation for remediation.

### HEMLOCK CREEK TRAIL CONSTRUCTION STARTS

The construction of the Hemlock Creek Trail in Independence is underway! A public groundbreaking took place June 2, 2018. The $3 million, 1.7-mile multi-purpose asphalt trail, which is part of the West Creek Greenway network, links Independence and the Ohio & Erie Canal Towpath Trail, winding through parts of historic Independence and the Cuyahoga Valley National Park along the way.

The majority of the path is located along the abandoned Hemlock Road/ Stone Road right-of-way and former quarry haul roads along Hemlock Creek, through the Cuyahoga River Valley, and inside of CVNP. The trail includes several bridges, some of which are part of this construction project.

The project is expected to be completed this fall.

R.E. Warner has been proud to provide civil engineering and surveying services for the project.

Read more about the project here.

## COMMERCIAL & INSTITUTIONAL MARKET

### TRI-C COLLEGE-WIDE ELECTRICAL INFRASTRUCTURE MAINTENANCE

Cuyahoga Community College is in the process of upgrading or repairing a large portion of its facilities thanks to the passage of a Capital Bond Issue in November 2017. R.E. Warner has been selected as the **Criteria Architect/Engineer for the nine electrical projects that are part of this Infrastructure Maintenance Program**. With an estimated construction cost of $2.5 million, the projects in this package span four locations and include items such as replacement or modifications to lighting, power distribution, circuit protection devices, emergency back-up power, and various miscellaneous projects that are electrical in nature.

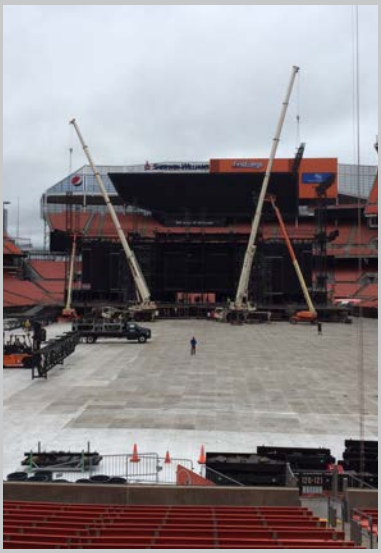
As the C-A/E, R.E. Warner's scope of services includes field investigating each project and one or more of the following levels of services depending on the individual project's level of complexity: concept and design criteria, best value selection, pre-construction and construction and closeout services.

### R.E. WARNER TEAM HELPS CLEVELAND PREP FOR BEYONCE OTR II

When the Director of Stadium Facilities for the Cleveland Browns calls and asks for assistance with constructing Beyoncé's stage for her OTR II tour stop in Cleveland, you get to work! Survey Crew Chief Rocky Porterfield and Civil Designer Mike Christopher were out at FirstEnergy Stadium helping crews build the stage for Beyoncé and Jay-Z's concert that took place Wednesday, July 25, 2018. Our scope of work was to set the location of and elevations on the stage, the tracks, the camera booths, and decks.

Rocky and Mike worked hand-in-hand with Robert Hale, who is the Site Coordinator for Live Nation, specifically Beyoncé's OTR II World Tour. When they started, he had just arrived from her Paris show, and so had to get everything organized in a short period of time. He showed the crew what he needed to keep the process moving smoothly, and they jumped right in.

The stage itself was about three stories high, taking up the entire west zone of the field in width, and extending 20 yards in length. The lighting and stage tracks coming off the main stage run the length of the field for Beyoncé to walk the crowd.



As with any surveying project, where due to unforeseen conditions, crews must improvise, adapt, and overcome, this was no different. With the stage being so big, time frame being so tight, and parts being shipped in hourly from the OTR II Paris show, many people were working on top of each other. Great communication skills were crucial for everyone involved.

We started the project on Thursday, July 19, and after several air freight delays, our team members finished around 7:30 p.m. Monday night, with other stage crew right behind them setting pieces in place as they set marks on the ground for placement.

# NEWS OF NOTE

## R.E. WARNER NAMED A TOP FIRM

R.E. Warner has been named among the Top Design Firms on ENR Midwest's annual list, ranked by revenue.

The firm was also named on Crain's Cleveland's list of Largest Engineering Firms, ranked by the number of local registered engineers.

We congratulate all who earned spots on these lists and are proud to be in such good company. It is an honor to be recognized as a firm making significant contributions to our region.

# R.E. WARNER PRESIDENT TED BELTAVSKI, PE, MS NAMED CHAIR OF VISITING COMMITTEE AT CSU WASHKEWICZ COLLEGE OF ENGINEERING

R.E. Warner President & CEO Ted Beltavski, PE, MS has been named Chair of the Visiting Committee at Cleveland State University's Washkewicz College of Engineering.

R.E. Warner views our involvement with the College as key to recruiting top talent and ensuring today's students are prepared to be tomorrow's engineers. Further, we are proud to be associated with one of the top engineering schools in the region.

To maintain its accreditation by ABET, the College must have in place an advisory committee comprised of members from industry, government and research bodies. Representing the interests of Washkewicz's customers, the committee "meets regularly to assist in guiding the efforts of the college so as to produce engineers that satisfy the needs of today's employers, as well as moving to improve the overall health and reputation of Cleveland State's engineering programs."

Ted has been a member of the visiting committee for the past several years and recently accepted the invitation to serve as Chair for the next several years.

**"R.E. Warner views our involvement with the College as key to recruiting top talent and ensuring today's students are prepared to be tomorrow's engineers."**

The Washkewicz College of Engineering at Cleveland State University is one of the fastest growing engineering colleges in the U.S., currently enrolling over 2,000 students. The College recently dedicated its new 100,000 square foot building addition with teaching and research laboratories, simulation labs for computer modeling, student collaboration spaces and smart classrooms, for which R.E. Warner was proud to provide construction surveying services.

# HAPPY RETIREMENT TO PROJECT DIRECTOR BOB RAMER

R.E. Warner staff, retirees, and friends gathered in June to celebrate Bob Ramer as he retired from the firm. Senior Vice President Brett Neff, Project Director Ed Dziubek, retired former R.E. Warner president Dave Sminchak, and retired structural engineer Dave Moes gave speeches honoring Bob's impact on all those he worked with and his positive influence in helping to grow the company.

The firm also recently celebrated Bob's 50-Year Work Anniversary. Click here to read the profile of his illustrious career prepared for that occasion.

# CHRIS WEEDER IS R.E. WARNER'S NEWEST PE

R.E. Warner commends structural engineer Christopher A. Weeder for successfully passing the State of Ohio Professional Engineer's exam, earning his professional engineering license. PE licensure signifies an engineer's competence, dedication, and commitment to quality and ethics.

To earn their PE, engineers must: earn a four-year degree in engineering from an accredited engineering program; pass the Fundamentals of Engineering (FE) exam; complete four years of progressive engineering experience under a PE; and pass the Principles and Practice of Engineering (PE) exam.

Chris has been part of R.E. Warner's structural engineering department for four years. He holds a Bachelor of Science in Civil Engineering from Cleveland State University. His experience includes structural steel and concrete design for various large-scale industrial and commercial clients, including serving as the lead structural engineer and resident engineer for the installation of a new $250 million bar rolling micro mill.  Chris is proficient in AutoCAD, WinBeam, Lingo, MATLAB, HydroCad and Visual Analysis.

Well done, Chris!

# NEWEST TEAM MEMBERS

*R.E. Warner welcomes the following new team members, adding to the strength and tradition of our growing organization.*

## WAYNE GALLION // SENIOR PROJECT MANAGER

Wayne Gallion joins R.E. Warner as a Senior Project Manager reporting to Frank Johnson. He is managing projects in the Power market.

Wayne has over 20 years of design experience for mechanical and electrical projects, including distribution/transmission substation design, substation component installation and design, relay installation and design, SCADA, RTU, reviewing, checking and entering transmission line data, and transmission line map design and revisions. His computer skills include using AutoDesk versions R12 - R2009, Microstation, DesignCad, P.D.M.S., and Tee-Lok. P.D.M.S., CAPE line constants software, K03 & K71, and Hazard Responder for Weather Emergencies. His additional experience includes supervising contractors, establishing work packages, tracking progress, and budgets.

Wayne comes to us from another multi-discipline engineering firm in the region where he worked as a designer. Prior to that, he spent over 10 years at FirstEnergy.

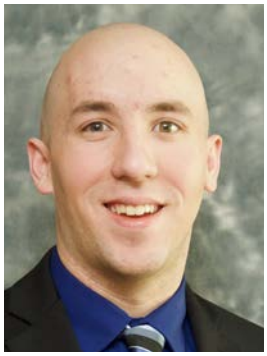
Wayne lives in Massillon, Ohio with his wife and two children. In his free time, he enjoys working out, coaching softball, and camping on the Ohio river.

## ALEX LIBBY // ELECTRICAL ENGINEER

Alex Libby joins us as an Electrical Engineer reporting to David Walls. He will be assisting with our ongoing work in the Power market.

Alex is a recent graduate of The University of Akron with a bachelor's degree in electrical engineering. His computer skills include AutoCAD, PSpice, LTspice IV, Arduino, C Programming, and MatLab.

Alex is currently performing electrical engineering for FirstEnergy. FirstEnergy has purchased several substations from municipalities in Northeast Ohio and has tasked R.E. Warner with assisting with upgrading select equipment for connection to its existing SCADA system.



# IN MEMORIAM

*Remembering dear colleagues who have recently passed*

## SENIOR ELECTRICAL DESIGNER RICHARD JONES | 1965 - 2018

Senior Electrical Designer Rich Jones, of LaGrange, passed away Saturday, August 18, 2018 at the age of 52.

Rich joined R.E. Warner's Electrical Engineering Department in November 2013. He was a key team member on many significant projects in the Power, Auto & Manufacturing, Steel and Government markets during his time here. He will be greatly missed.

Born August 28, 1965 in Akron, son of Robert Lee Jones (deceased) and Mary Ann (the late Fred) Young. Rich enjoyed golfing, bowling, going to concerts, vacationing in Atlantis, gardening and working in the yard. He was a loyal Patriots fan and was a collector of lighthouses. Rich loved baseball and was the pitcher for the PODA little league team in Akron. He worked as an electrical engineer for 30 years.

He leaves behind his wife, two daughters, step-children, five siblings, and many dear friends.

## FORMER R.E. WARNER PRESIDENT VINCE TRAINA, PE | 1929 - 2018

Former R.E. Warner President Vince Traina, of Sandusky, passed away Saturday, August 11, 2018 at the age of 89.

Vince was R.E. Warner's third President & Chairman, elected to the position in 1981. During his tenure, R.E. Warner began to expand into Chemical Process, Manufacturing, Commercial and Governmental markets. In addition, R.E. Warner became licensed to provide architecture services in Ohio.

Vince retired and passed the presidency and chairman baton to elected successor Dave Sminchak in 1995.

Vince was born April 16, 1929 in New York City, the older son of Peter and Mary Traina. He was a resident of Vermilion, Ohio for more than 38 years before relocating to Sandusky in 2008. Vince was a member of Sts. Peter & Paul Catholic Church in Sandusky and previously served and was president of St. Mary's Catholic Church's Parish Council in Vermilion. He also served on the Board of Trustees of Lorain County Community Hospital (Mercy Regional Medical Center) and was a peer reviewer for the American Consulting Engineering Council.

He graduated from Manhattan College and University of Michigan and was a Professional Engineer in several states. He served in the US Army in Korea.

# PERSPECTIVES & INSIGHTS

BIM

## UNDERSTANDING LEVELS OF DEVELOPMENT IN BUILDING INFORMATION MODELING

*This article is by Chris Kushinski, Senior Mechanical/Civil Designer. Chris has over 20 years experience in mechanical and civil design and supports the engineering designs associated with a wide variety of industrial and municipal projects. Chris is well respected by our team for his strong technical knowledge and skills in the use of our company's design and production standards. He has been instrumental in the development and implementation of our BIM standards.*

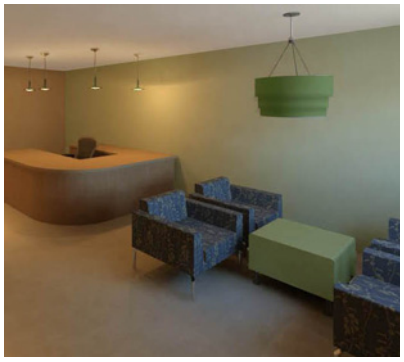
As Building Information Modeling (BIM) becomes increasingly utilized in our day-to-day work, it is increasingly apparent that there is a need to better explain the Levels of Development (LOD) to which a model can be created.

When a client requests a model, we as the consultant must ask what the intended use will be and from there recommend to which LOD the model should be created. More detail is not necessarily better. First, the higher the LOD, the more cost the client will incur – we do not want to spend additional time modeling elements above the desired level. Second, the higher the LOD, the larger the computer file. Large model files become more burdensome on computer resources and can be unusable by the client.

Ultimately, we want to develop a model at an LOD where all the necessary information is available, but there is no extraneous detail that has driven up the cost of the project and/or made the file size unwieldy.

**"More detail is not necessarily better."**

Sometimes this may mean creating the overall model at a lower LOD but drawing certain elements or areas of the model at a slightly higher LOD. For example, we may provide greater detail of a congested area of a building to provide for interference checks and aide in the fabrication of certain pieces. Meanwhile, the other areas of the building are modeled at a lower LOD because interferences and fabrication are not critical or required.



*S&V Industries Office Interior Model (LOD 500)*

Ideally, discussions about LOD should happen during the very early stages of a project. This will ensure that the needs of the client are met and that we are providing the proper amount of information per the agreed upon LOD.

View our capabilities or contact us to discuss your next project.

# BIM LEVELS OF DEVELOPMENT DEFINITIONS & EXAMPLES

**LOD 100** – Overall building massing indicative of area, height, volume, location, and orientation.

**LOD 200** – Model elements are modeled as generalized systems or assemblies with approximate quantities, size, shape, location, and orientation.

**LOD 300** – Model elements are modeled as specific assemblies accurate in terms of quantity, size, shape, location, and orientation.

**LOD 350** – Model elements are enhanced beyond LOD 300 by the addition of information regarding interfaces with other building systems.

**LOD 400** – Model elements are modeled as specific assemblies that are accurate in terms of size, shape, location, quantity, and orientation with complete fabrication, assembly and detailing information.

**LOD 500** – Model elements are modeled as constructed assemblies actual and accurate in terms of size, shape, location, quantity, and orientation.

*Sources:*
*AIA Document E202 – 2008 Building Information Modeling Protocol Exhibit Level of Development Specification Ver: 2017*

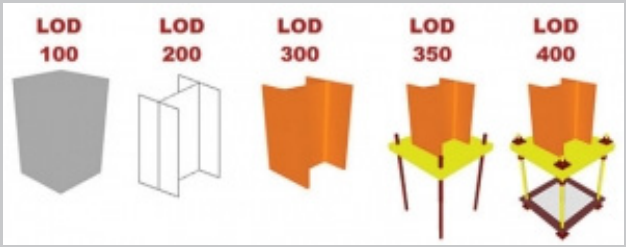
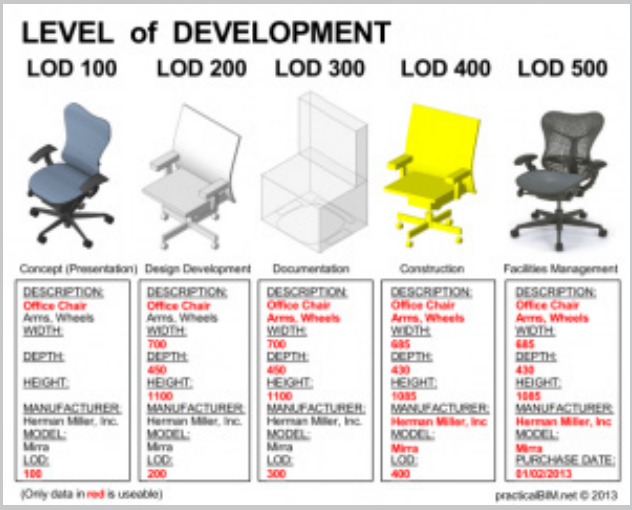



*Image © practicalBIM.net*

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# SERVICE GARAGES: THINKING THROUGH SPECIFICS TO ENSURE SUCCESS

Today we're going to talk about services garages. While some may consider these bland, unexciting buildings, they are actually highly important, unsung heroes of municipal infrastructure. They operate in the background, commanding little attention, yet facilitating critical functions. In the event of a potential calamity such as a snow emergency or water main break, these facilities allow maintenance personnel to respond quickly and effectively, so that residents and workers can continue to go about their business.

What's more, not one is like another. Having completed over 20 of these buildings in the last 15 years, we understand that while they may all have similar components, the ways in which they are specifically designed are vastly individualized. Thinking through these specifics is crucial to success.

Without further ado, here's a look at the "what" and "how" of service garage design.

First, let's go over the usual pieces and parts of these buildings. The average service garage may have:

- Storage
  - Cold
  - Bulk
- Maintenance
  - General
  - Specific
- Maintenance Bay(s)
- Wash Bay(s)
- Operations Support
- Locker rooms
- Laundry
- Break room
- Offices
- Back-Up Power
- Access controls

That's a fairly short list and it looks pretty simple, but if we do our jobs right during the discovery and assessment phase of a service garage project, the actual design becomes much more involved – all to ensure the building truly meets its functional goals and does not swap old usage problems for new. Additionally, we look for ways that the building can facilitate not just construction cost savings, but also operations savings. Here is what we investigate:

**Why is the client undertaking this project?** Is the building too old? Too small? Does it have the wrong types of spaces? Do they need more than one facility?

**Type of construction project**. Is the client renovating, expanding or building new? Whichever direction we're heading, there are a plethora of items to investigate/ plan for.

**Type of service garage.** What type(s) of facility will this be? Is there maintenance and if so what do the personnel stationed at this garage do? Roads? Water? Fueling? Is it primarily for vehicle storage?

**The staff.** Who is going to be operating out of this facility? What is their culture like? What do they like about their current building and what do they want to see changed? If there are multiple departments sharing the building, can they share resources and/or space? Are there any vendors/suppliers that service the facility, such as salt or fuel delivery? What are their needs (e.g. a site that can accommodate a certain size of truck)?

**Needs vs. wants.** What types of spaces and amenities are essential? What would be nice to have? For example, do they need vehicle bays? How many? How about offices? Laundry facilities? And what about lockers? Perhaps like one of our previous clients, they need two types of lockers – dirty and clean. There are always the "nice to haves" as well if it is workable with the budget. This "wants" list could be endless, including having multiple service bays because one just isn't enough or something as simple a window in a room so the director can see an area without leaving his or her office.

**Geographic coverage area.** The coverage area the station services will determine things like: how much salt they need to store; how many trucks there will be; whether there should be one site in the middle of the coverage area or two sites located east/west or north/south.

**Style.** Do they need to follow a certain architectural style to fit in with the rest of the public buildings? Is the style a result of functional needs or the budget that the project needs to fit within? Often it is requested that the building be a metal building system with a CMU base for durability. We use these criteria items to develop an aesthetically pleasing building that also functions as intended.

**Equipment.** Is the client bringing old equipment? Buying new? Do they need generators? What kind? Will they have a crane? What kind?

**Location.** Location makes a difference in many ways, especially with regard to power and security.

**Power needs.** Will the facility be located in a residential area? If so, we need to account for power. Transformers and additional feeds may be needed. Can the power supply handle a 480v generator?

**Security needs.** Does the site need to be gated? At one of our service facilities, the impound lot is located on the same site, so they needed it to have a high, barbed wire fence. And it's not always just the site that needs to be locked down, sometimes it's certain rooms. Another building we did had a tool room that only certain people could access due to previous issues with theft.

**Future growth/change.** Are there any process or operational changes in the near or far future? We had a client who was currently getting five deliveries of salt but wanted to have a dome big enough to get one large delivery. They were planning to change to one delivery once their current contract was up because it was less expensive.

**Budget.** Most critically, we need to work through accommodating needs/wants with the clients' budget. We have worked with all budget types and have always been able to massage the wants/needs into a building that works; however, expectations must be realistic. Sometimes there are things a client wants to do that they cannot afford right now, but we can design the building such that they can be added in the future, similar to a new residential home having an unfinished basement that is plumbed for a bathroom and wired for a home theater system.

While some A/E professionals may not find these buildings to be glamorous work for their portfolios, we get really excited about them. We know how crucial they are to fulfilling our municipal clients' missions and we therefore take the time to analyze the ins and outs of their current and future usage to ensure they are designed for success.

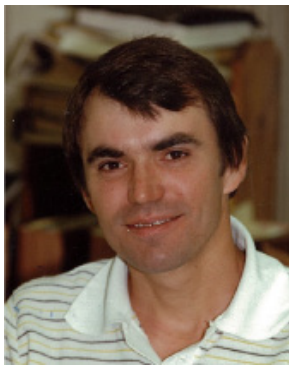
*This article is by Jen Kalin, RA, LEED AP, Architect and Senior Project Manager. Jen has over 10 years of experience in public, commercial, manufacturing, and residential buildings and facilities. Her experience includes programming, schematic design, design development, construction documents and construction administration. She has the capability to provide interior design/interior architecture services. Her portfolio includes new construction, renovation, and expansion projects.*

# CONGRATULATIONS!

*We congratulate and thank these outstanding team members celebrating milestone work anniversaries*

## ED DZIUBEK, PE - 45 YEARS

### *Project Director*



Eddie joined R.E. Warner on June 11, 1973 as a civil engineer. Over the years, Eddie has worn many hats at R.E. Warner, from engineer to a serving in a variety of leadership roles.

With over four decades of design, management and construction administration experience on capital improvement and maintenance projects for metal production and processing facilities, today Eddie serves as a Project Director focused on managing projects and developing business in the metals market.

"Eddie's dedication to R.E. Warner for the past 45 years along with his passion for developing relationships with our clients is truly what sets him apart from his peers in our industry," Brett Neff said.

Asked which project he is most proud of, Eddie said: "The Arconic Martinsville, VA forging, grinding and hot metal manufacturing plant would be the one I'm most proud of. I was the project manager on the original job (when the company was known as RTI International) that lasted 2008–2012. The project was successfully completed for all parties involved. Now we are involved with additional expansions at the facility. The best sales pitch a company can have is by just doing good quality work."

## RANDY CECIL - 45 YEARS

### *Senior Project Manager*

Randy joined R.E. Warner on July 31, 1973. Over the years, Randy has served as an electrical/I&C designer, senior designer, electrical department manager, project engineer, and project manager. With excellent technical and project management skills, he boasts a well-rounded portfolio with dozens of projects in each of the firm's markets, having served in varying capacities on most of the firm's landmark projects during his tenure here.

Asked about his favorite project, Randy had this to say: "My favorite project would have to be the recent Forge Press installation. It was one of those projects where the client was very easy to work with and knew what they wanted. In-house, we had great people working on it which led to a very smooth construction period. The contractors were very good and resolved issues with all parties without any major problems. And finally, the vendor supplying all the equipment was excellent, and despite a language barrier, was very easy to work with."

"A great project is made up of great people and I was fortunate to have many great people working with me on this project. Being a very part-time knifemaker, the best part of the project was to watch a red-hot, 7-ton ingot of steel be reshaped by a press with 3,000 tons of force. Unbelievable!"

In 2013, Randy became a senior project manager and has since been focused on selling and managing projects in the metals market. His attention to detail and dedication to service ensures clients are well taken care of.

# LYDIA JANIS - 30 YEARS

## *Marketing Coordinator*

Lydia joined R.E. Warner on April 4, 1988 and has been a loyal and dedicated team member during her three decades with the company. She is a team player, has a positive attitude, and is always willing to lend a helping hand.

Lydia started as a part-time clerk in 1987 while a junior at Lorain County Joint Vocational school. Upon graduation, she joined full-time as a clerical secretary. Over the years Lydia was promoted to Environmental Division Secretary, Environmental/Civil Secretary, and Administrator/In-House Auditor for our ISO-9000 QSAS certification. In 1999, she was promoted to Marketing Assistant, and in 2001 she became our Marketing Coordinator. In 2004, was elected a shareholder of the Company.

Lydia plays a crucial role in securing new opportunities for our company by producing qualifications statements and otherwise supporting the firm's business development/client retention efforts. Her additional accomplishments include doing much of the heavy lifting to execute the firm's website redesign in 2014 and launching several publicity initiatives, including R.E. Warner's *Excellence By Design* newsletter, social media profiles, and e-mail marketing program. Lydia's attention to detail and drive to continually improve demonstrate her commitment to excellence in all that she does.

"Lydia's dedication and passion has garnered her numerous commendations for her efforts and great work here at REW," said Brett Neff. "She is well known as a go-to employee!"

# BRETT NEFF - 25 YEARS

## *Senior Vice President*

Brett joined R.E. Warner on June 7, 1993 after graduating from Ohio Northern University with a Bachelor of Science in Civil Engineering. He quickly emerged as a firm leader and business development natural due to his technical mindset, business sense, and penchant for networking.

Over the years, Brett has served as a civil design engineer, resident construction representative, project manager, division manager and director of business development. He was selected as a shareholder in 2000, Member of the Board of Directors in 2003, Vice President in 2007 and Senior Vice President in 2015. Brett is also Principal of the Government, Commercial and Auto & Manufacturing markets. He was named among the Crain's "40 Under 40" class in 2007.

Brett participates in numerous professional and civic groups. He is on the Board of the Cleveland Engineering Society, and he is one of six founding members of the Northeast Ohio Chapter of the Society for Marketing Professional Services. He is a member of the Cleveland Area Board of Realtors, serves on the Gorman-Lavelle Corporation Board of Directors, and is a Solon Italian Club Trustee.

Further, Brett is actively involved with his high school and collegiate alma maters. He is Past President of the Ohio Northern University Alumni Board of Directors and a former special trustee to the University Board of Directors. He is also a member of the Walsh Jesuit High School Alumni Association and supports the school's athletic program as a volunteer track and cross country coach.

# PROFESSIONAL INVOLVEMENT

## 2018 OHIO STORMWATER CONFERENCE RECAP

*Keeping Up-To-Date with Stormwater Management Practices*

As regulations, technology, and engineering practices evolve, it is important for civil engineers, city officials, and others in construction to stay informed of changes in the world of stormwater management. Here in Ohio, we're lucky that the Ohio Stormwater Association coordinates the annual Ohio Stormwater Conference, providing a one-stop shop for networking with and learning from those who are stormwater management experts and those who are responsible for the regulations governing the design of stormwater systems.

I was fortunate to be one of the over 900 attendees at the 2018 conference. The event served as a great resource to get updates on environmental issues, new technologies, regulatory information and pollution prevention as it relates to stormwater management.

Following are a few key takeaways from the conference:

A major topic at the conference was the **Ohio EPA's General Construction Permit update**. This document specifies guidelines engineers must follow when designing a site, providing quantities, equations, and descriptions for different engineering techniques. The major change to the permit is a new water quality volume calculation. In the equations, the constant for precipitation depth was changed from 0.75 inches to 0.9 inches. This change increases the total water quality volume. The water quality volume is a quantity used to determine how much water must be treated on a site. This quantity can affect the size and footprint of Best Management Practices (BMPs) employed at the site. (BMPs are structural, vegetative or managerial practices used to treat, prevent or reduce water pollution, such as stormwater basins, underground retention systems, or bioretention cells.) While the Water Quality Volume calculation increased, the general permit also set forth a list of drainage techniques that if used will allow owners to reduce the overall water quality volume. This allows civil engineers to use different drainage techniques such as grass swales and filter strips to treat water before it enters a BMP. Doing this can decrease the size of a pond or underground storage tank which

allows for more space to be utilized on a site.

Another hot topic at the conference, especially for those of us professionals who work in and around Cuyahoga County, was the **Northeast Ohio Regional Sewer District's Stormwater Master Plan presentation**. NEORSD's Regional Stormwater Management Program "addresses problems related to stormwater runoff from hard surfaces. Runoff contributes to regional stream flooding, erosion, and water-quality issues, and the program improves our ability to further address stormwater problems that cross community boundaries." The presentation covered NEORSD's strategy for prioritizing stormwater projects within different watersheds in order to maximize their effectiveness.

In addition to executing its own green infrastructure projects, NEORSD is also encouraging property owners to complete their own stormwater control measure projects by extending a tax credit for completion of such work. NEORSD has levied a tax based on impervious surface area on a property to help fund its stormwater management program. Property owners receive a credit through activities that reduce or alleviate the District's cost of providing a stormwater program. For a flat 25% reduction, an owner can implement rain gardens, on-site stormwater storage, vegetated filter strips, or pervious pavement. For up to a 75% rate reduction, an owner needs to construct a SCM that reduces peak flow as well as the total runoff volume. We have helped many clients implement these SCMs, maximizing credits and performing the required yearly inspections for them. In one project for a scrap yard, we were able to utilize detention basins constructed several years ago to receive the stormwater fee credits.

From a "national trends" perspective, as an engineer, it is always helpful to see what new technologies and practices are being used in different parts on the country to get ideas for how to improve local practices. **Several speakers presented permeable pavers case studies**, giving us the opportunity to see whether and how this technique could be a better solution for some of our clients. As permeable pavers become more widely used, it is insightful to learn how other projects have fared using these materials and strategies. While in the design process it is ultimately up to the client to decide what is in their best interest, we have found that permeable pavers are often an option that while more expensive up front can reduce long-term maintenance costs.

Finally, one of the keynote speakers at was Joe Sullivan of the Nation Weather Service. Joe spoke about weather and climate on a regional and global scale, describing both mankind's effect on climate, as well as our inability to change things on a global and drastic scale. He also poignantly reminded attendees of our duty as engineers and builders to be mindful of climate, and to build and design responsibly so that our environment is not compromised for future generations.

Having had some time now to digest all of the insights from this conference, I am excited to be applying this knowledge in my day-to-day work at R.E. Warner and I'm looking forwarding to continuing to provide improved solutions for clients as stormwater management further evolves.

*This recap was written by Bill Vasko, EIT. Bill holds a Bachelor of Science in Civil Engineering from the University of Akron. His experience includes site design, stormwater management, roadway inspection, and construction management for a variety of public and private clients.*

## OTHER ACTIVITIES

R.E. Warner staff continued to stay active with professional groups within our markets and the general A/E sphere:

- Structural Engineer Ryan O'Hearn, PE and Senior Project Manager Matt Benovic, PE, SE attended the ASCE Cleveland Section Annual Dinner at Progressive Field in June. At this event, Matt was honored as the outgoing President and the incoming officers were inducted, including Ryan as Vice President.

- Senior Vice President Brett Neff was in attendance at Ohio Northern University T.J. Smull College of Engineering's Senior Showcase to provide feedback to students and also participate in a discussion about potential curriculum changes with Dr. Bryan Boulanger, Chair of the Civil and Environmental Engineering Department.

- Vice President Frank Johnson, PE, Project Director Eddie Dziubek, PE and Senior Project Manager Matt Benovic, PE, SE connected with colleagues and heard excellent technical presentations at AISTech 2019 in May.

## OUR MISSION IS TO PROVIDE TECHNICAL SOLUTIONS THROUGH TEAMWORK AND A PASSION FOR SERVICE.

Since our founding in 1951, R.E. Warner & Associates, Inc. has experienced steady and continuous growth. Building on our traditional strengths and values, we have entered into new fields only when it is consistent with the basic mission of our company. Today, R.E. Warner is a full service, multi-discipline consulting firm serving both public and private clients.

We call ourselves multi-discipline because we offer professional services in civil, structural, mechanical, electrical and process engineering; architecture and planning; surveying; and environmental science and engineering.

Our impressive list of clients includes many of our nation's largest steel, automotive and chemical producers, electric power companies, health and educational facilities, and various agencies of the federal, state and local governments.

R.E. Warner's mission is to provide technical solutions through teamwork and a passion for service. Our areas of practice include buildings and facilities, industrial operations and process engineering, infrastructure, transportation, energy management, surveying, environmental and construction services.

In order to fulfill our mission to our clients, R.E. Warner consistently recruits, hires and retains the leaders in our profession. In recognition of our great workplace, R.E. Warner has been named a multi-year winner of the NorthCoast 99 Award, presented annually by the Employers Resource Council to the top 99 companies to work for in Northeast, Ohio.

We invite you to contact many of our peers to discover how working with R.E. Warner can be economical, efficient, professional and down right pleasant!

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