McNEIL ENGINEERING
Economic and Sustainable Designs, Professionals You Know and Trust

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Inside This Issue:

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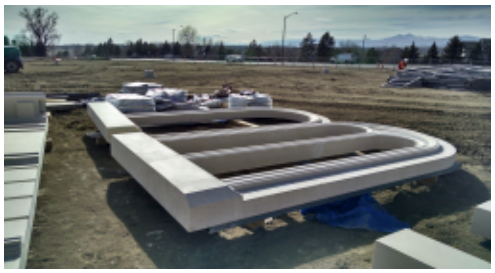
LDS Temple: Fort Collins, Colorado

Our work at McNeil Engineering takes us all over the western United States. Here's a look at a project our Structural Engineering department recently completed in Fort Collins, Colorado.

For the new LDS Temple in Fort Collins, McNeil Engineering was the Specialty Structural Engineer of Record for the precast concrete façade on the building's exterior. These concrete panels created the exterior building enclosures and were individually engineered by our very own Matthew Roblez, S.E. SECB.

Construction of Fort Collins Temple

This project required help from an entire team of folks, not only in the U.S. but also outside of the country. The concrete panels were fabricated in Mexico City, Mexico by the Pretecsa Corporation. Once the panels were finished, they were carefully transported to the job site in Colorado.



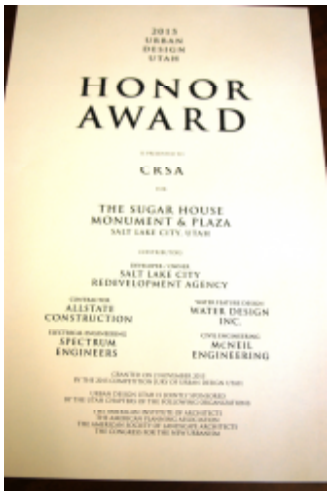
Precast concrete façade pieces designed by McNeil Engineering's Matthew Roblez

Construction of Fort Collins Temple

The communications process in and of itself was quite a feat. The general contractor on the project was based in Salt Lake City and the erectors were based at the job site in Fort Collins. Thanks to modern, web-based technology, we were able to keep in touch with everyone from Mexico to the Rocky Mountains in order to get the job done.

Award Winning Project…Sugarhouse Monument & Plaza

On November 2nd McNeil Engineering's Civil Department was recognized for their role in the re-development of the Sugarhouse Monument and Plaza.



Since the late 1980s, The Sugar House Monument Plaza has been the heart of the Sugar House Business District in Salt Lake City. At McNeil Engineering, we were honored to be a part of the revitalization of this important public space, working with the lead design firm CSRA and Allstate Construction.

This project on the corner of 2100 South and Highland Drive is now an incredible community gathering place, including more than one acre of open public space, new dining areas and public art displays. You'll also see pedestrian-friendly light displays, new bike racks and even art..

Fiber Reinforced Concrete is Great… Here's Why:

Fiber reinforced concrete slabs have been around for a while, but they are just starting to get popular. While the old fashioned way of mixing and pouring concrete around rebar sounds like a logical solution to building structures, it isn't very efficient when it comes to saving time or money. It isn't just savings that fiber reinforced concrete provides though. Many engineers argue that this kind of solution provides a better final product too.

A great example is happening right now in Bellevue, Washington. A building that houses luxury condos, a hotel, dining and even retail space was constructed with gigantic slabs of fiber reinforced concrete..Usually, these slabs require thousands of dollars worth of rebar, but not this time around.

Fiber-reinforced concrete developed in part by UW–Madison engineers protects The Lincoln Square Expansion in Bellevue, Washington against frequent earthquake activ-

As more buildings start utilizing these unique materials, many engineers and contractors are hoping the technology and access becomes more available. Matthew Roblez, S.E., SECB here at McNeil Engineering had this to say about fiber reinforced concrete.

"I have been specifying fiber reinforced concrete in slabs for many reasons. The most prominent is much like this article states, the savings in labor and steel. In addition to this, it has been my experience in my 20 plus year career, that one gets a better product using fibrous reinforcement over traditional steel. Anyone out there who is looking at replacing a driveway or a slab should definitely use fibrous reinforcing. Fibrous reinforced concrete is highly overlooked, especially in residential slabs. I am happy to see that a "large" project is finally having fibrous reinforced concrete realize its potential. "

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It will be interesting to see if this is the beginning of a new trend, but only time will tell.

FUN FACT

There are less than 20 bobsleigh tracks in the entire world approved by the sport's international governing organization. The 2002 Olympic track in Park City, Utah, is the southernmost track in the world and is designed for bobsleigh, luge and skeleton events. The $25 million bobsleigh track in Park City, Utah is the most challenging sports track of its time.

The following is an article published in the latest issue of "Mining Focus" the Utah Mining Association's Magazine, written by Henry Fox of McNeil Engineering

Smart Management Decisions

Whether you're the President of the company, middle management, the facility manager or a department manager you are responsible for making numerous decisions every day. Most of those decisions affect the bottom line of your organization. Managers are always looking for tools and ways to improve processes and make their organization better and more productive, keeping in mind that the bottom line truly is the bottom line.

Isn't it every manager's dream to get more for less? And, if you knew you could get more bang for your buck, wouldn't you jump at the chance. So start jumping! You're probably asking yourself what am I jumping after…the answer, 3D laser scanning technology, also known as LiDAR. I'm sure a couple more questions just popped into your head: What is 3D laser scanning and how can it help my bottom line. Let's take a look at both of these questions.

What is 3D Laser Scanning?

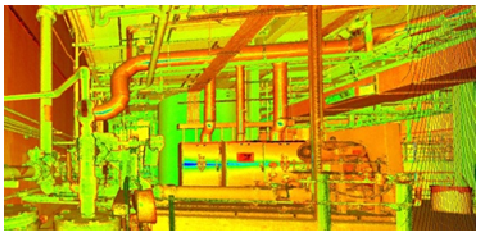
3D laser scanning technology is just that, laser scanning. This technology accurately captures all available visual information of a site or building. There are several different scanners out there capable of capturing 50,000 to over a million survey grade points per second. The scanner collects points through a 180° degree rotation. The scanner works by combining a laser emitted beam, a mirror deflecting the beam towards the scanned surface, and an optical receiver, which detects the laser pulse reflected back from the object. Since the speed of light is known, the travel time of the laser pulse can be converted to a precise distance measurement. Typically this data is collected from each set up in less than 5 minutes. The group of points from each setup is referred to as a "point cloud." The point cloud from each set up is then registered or "stitched" together so that one measureable point cloud is created for the entire scanned area. The point cloud can then be modeled in AutoCAD, Revit, or other 3D modeling software packages to capture all available visual information for analysis.

Wow!! What's all that really mean? It means that this technology will gather more accurate data in a shorter amount of time. More bang for your buck!

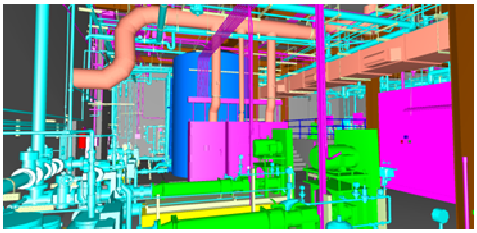
How Can 3D Laser Scanning Help My Bottom Line?

Let's take a look at two ways 3D laser scanning can help your bottom line. This is the "what's in it for me" part. Let's talk about facility modification and improvements as well as volume calculations.

Facility Modifications and Improvements:



Point Cloud from Industrial Building Scan



3D Model from Industrial Building Scan

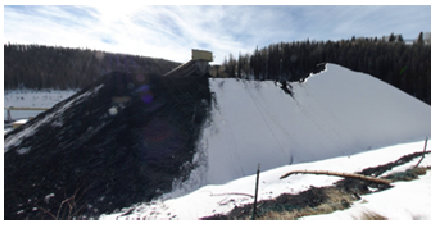
Have you ever tried to make modifications or improvements at your facility and the measurements on the plans were just not working out? Or you spend hours or even days taking measurements, only to find out there are additional conflicts you did not account for. The use of 3D laser scanning technology gives you the ability to design from extremely accurate record documents. No more hand measurements that take days to capture and produce less desirable record drawings. With 3D laser scanning technology, data capture is extremely FAST and ACCURATE; it takes the guess work out of design and gives you the ability to make educated design decisions.

In addition to the scan data collected at each scanned location 360° panoramic photos are taken and embed directly into the pdf file of the survey drawing. These panoramic photos cover the entire scanned area and are taken with a High resolution camera. This additional information can provide a better understanding of the existing conditions of your project and allows for quick design decisions.

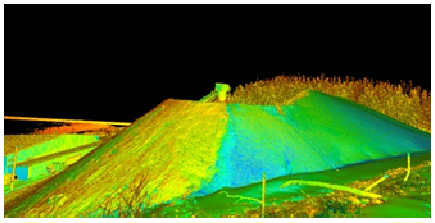
Project Example: A Utah mining company needed to make modifications to their Mill Works Building. 3D laser scanning technology was utilized in the design stage of this project. A scan of the building was completed and the data collected was used to create a 3D model of the facility. The model was then used to design modifications around the existing conditions. It is much better to determine conflicts on your computer monitor rather than discovering them during the construction phase. This process greatly reduces those costly over-runs and change orders. In addition, the amount of time the Mills Work Building is out of service due to modifications is greatly reduced.

Volume Calculations: Are you tired of using traditional methods to get volume measurements, just to find out that they weren't accurate? Are accurate monthly volume reports important to your bottom line? If the answer is yes, then the use of 3D laser scanning technology will give you the confidence to accurately report volume numbers.

Project Example: Several Utah mines use 3D laser scanning technology to accurately measure stock piles for monthly reporting. The use of this technology provides the confidence that volume measurements are accurate and monthly reports reflect accurate numbers.



Coal Stock Pile



Point Cloud from Stock Pile Scan

What's the bottom line? It all boils down to more for less, more accurate data gathered in less time making the completion of the project correct the first time. No more costly over-runs and change orders due to inaccurate data. The use of this technology will not only save you time and money, it can help you make better design decisions. Better design decisions equal better management decisions. So start jumping!!!

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McNeil Engineering is a Proud Supporter of U of U Athletics

Weather it's attending a home baseball game at Smith's Ball Park or listening to Coach Wittingham at the Crimson Club lunch, McNeil Engineering enjoys supporting the Utes.

During baseball season McNeil Engineering attends all home game in a suite at Smith's Ball Park. We will be doing this again this coming season. We always share the love to these games by inviting clients to join us. It won't be long and we will be sending out information about joining us for these games. Watch your email for more information to come.

McNeil Engineering also attends the Crimson Club monthly luncheon during football season.

GO UTES!!!

Employee Anniversaries this Quarter		
Employee	**Date Started**	**Years of Service**
Michael Hoffman	2/13/1995	21
Dave Sumner	3/11/2002	14
Matthew Roblez	3/18/2002	14
Cody Palmer	2/5/2007	9
Scott "Skip" Schoonover	1/1/2011	5
Shane Brower	3/25/20013	3
Troy Taylor	1/24/2014	2
Jacob Hendrickson	2/18/2014	2
Shad Seitz	2/18/2014	2
Augusto Pereira	1/12/2015	1
Ryan Filby	2/23/2015	1

A New Roof for a Historic Building

There's a church that sits across from the Utah State Capitol Building. This church was built back in the late 1920's and is currently on the **Utah, National and LDS Church's** historical list. To say this church is historically important would be an understatement.

Our Roofing Consulting Department was tasked to replace a synthetic tile roofing system that had been installed to replace the original roof. The synthetic tiles failed and had been leaking for several years. We were asked to design a new roofing system to comply with the original architectural style and to provide quality control during the construction to make sure that the system was installed properly.

To help in the design process McNeil Engineering's Survey team completed a 3D laser scan of the historic church. The data collected was used to create a 3D model which was used in the design of the new roof.

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We designed a slate tile roofing system to bring the look of the building back to it's original look and to give it the longevity that only a slate tile system can give. A quarry in Vermont was used to cut and shape the tiles to the designed shape. They were able to also supply the colors of tile that were chosen by the historical departments from the state and LDS church that would best match the original roof.

Thank You, Thank You!!!

All of the employees at McNeil Engineering want to join together and shout a huge THANK YOU to one of our co-workers...Eunae Kim. Eunae will be retiring the end of January after almost seven years here at McNeil Engineering. Eunae has single handedly kept McNeil Engineering in operation. Her dedicated service to McNeil Engineering can not be measured. Not only are we losing a wonderful employee, we are losing a great friend.

Eunae will be leaving the corporate world to become a full-time grandma, a new job she is really looking forward to. When asked what she is looking forward to most Eunae says, "spoiling my granddaughter."

What will Eunae miss most about working at McNeil Engineering? She will miss all her friends and of course Ajera, McNeil Engineering's billing system.

Thank you Eunae and good luck in your new adventure!!!

Termites Are Helping Architects to Design Energy Efficient Skyscrapers…

When a green architect does a particularly good job, you'll know it by the silver, gold, or platinum LEED certifications of the building. But the best eco-conscious construction doesn't need a seal of approval—and their builders don't care anyway. Mound termites, native to Africa, South Asia, and Australia, are pros at building self-regulating structures that maintain oxygen levels, temperature, and humidity. And now human architects and engineers want to adapt that ingenuity for their own designs.

From the outside, a termite structure just looks like a pile of dirt. But if you slice one in half things get a bit more complicated. The above-ground mound has an outer wall riddled with holes, which lead to a bunch of tunnels that themselves lead to a series of chimneys. And below the mound is a large, oval nest, where the queen resides.

How does the mound dissipate air through its network of holes? As the sun moves through the sky during the day, the air in the thinner chimneys on the outer edges of the mound heat up quickly, while the air in the mound's big, central chimney stays relatively cool. Hot air rises up through the outer chimneys and cool air in the central chimney sinks, circulating air continuously—injecting oxygen and flushing out carbon dioxide. At night, the flow reverses as the outer chimney air cools down quicker than the inner chimney air.

Copying termite strategies, architects and engineers can improve energy efficiency in buildings. Take Mick Pearce, a Zimbabwean architect who designed the award-winning Eastgate Center in Harare, Zimbabwe. Similar to termite mounds, the concrete outer walls of Eastgate are porous. As wind blows through the tunnels on a hot day, the concrete sucks up the heat, cooling the wind before it blows into the shopping center. Fans flush the heat out of the concrete at night so it will be ready to store more heat the next day. Following termites' lead, Pearce cut energy use down to about 10 percent of a normal building that size.

"Ultimately, we want to bring termite ventilation to buildings because it would allow the buildings to breathe freely," says Rupert Soar, a biomimetic expert at Nottingham Trent University. The next step: mimicking the *process* of termite construction. Scientists have already programmed computer termites to design complex structures based on real behavior—things like complicated porous walls with intersecting tunnels and ducts.