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The Next Generation of Learning

McNeil Engineering has had the opportunity to work on a few historical projects lately. The Utah State Hospital Museum, The historic Jefferson Hotel (Psycho Hotel) in Phoenix, Arizona, Capitol Hills Ward Building and the Santaquin City Museum to name a few.



Original Hillcrest Jr. High

However, sometimes its out with the old, in with the new. This is the case for Hillcrest Jr. High School, located on the corner of State Street and 5300 South in Murray, Utah. When the school year came to a close, it was the end of an era for the old Hillcrest Jr. High. The original structure was built back in 1911 and has had several additions over the years.

Since it was built, thousands of students and teachers have walked the halls, hundreds of band and choir concerts performed, and many lessons taught. But, now it's time to put the old behind and look to the new.

A new state of the art learning facility will replace the old school. McNeil Engineering had the privilege of providing **civil engineering** and **survey** services on this project. This included completing an ALTA/Topographic Survey and subdivision plat, site layout design, grading and drainage design, erosion control measures and design and relocation of utilities.



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According to Ted Didas, President of McNeil Engineering and head of our Civil Engineering Department, "It has truly been a privilege to be a part of bringing this new educational facility to the students in Murray School District. This new facility will be the means of educating thousands for the next hundred years."



New Hillcrest Jr. High

STEM College Majors Earn the Most at All Points in Careers

A study comparing college majors to post graduation income has found that students who major in science, technology, engineering, or mathematics earn the most, both at the start and later in their careers.



A report issued in May, by the Washington, D.C.-based Georgetown University Center on Education and the Workforce has found that when college majors are compared, those students with science, technology, engineering, or mathematics (STEM) degrees earn the most on average immediately after college. But the benefits extend throughout their career, from midcareer, to late in their career.

Petroleum engineers, have the highest average annual salary of all college majors, pulling in \$136,000 on average over the course of their careers. Pharmacy, pharmaceutical sciences, and administration majors rank second (tied with civil engineering), at \$113,000, and are the only non-engineering major in the top 10.

The Future of Concrete is Right Around the Corner

Have you heard of self-healing concrete? It's been making headlines all over the place lately. But what is it, exactly?

While the title itself sounds like something out of a science fiction story, "living" concrete is on its way to becoming a reality. Why is it necessary though? Concrete has been around for centuries and it's still an extremely popular building material. Does it really need to improve on itself? In a word, yes. Concrete cracks, and over time cracking means having to replace and re-pour new concrete. Which in turn, costs more money.



Here's what our very own Matthew Roblez, S.E., SECB, has to say about this leap forward in concrete technology:

"This is an important breakthrough because cracks in concrete allow water migration. Water migration causes damage and reduces the life of the concrete structures. A lot of money is spent on concrete additives and post applied waterproofing to help seal cracks. This would eliminate this cost and ultimately extend the life of the concrete structures. Additionally it would save in repair and replacement costs."

Anytime a client or company can save on costs it's a good thing, and self healing concrete could have a huge impact on the world at large, according to Roblez.



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"Eventually when this technology is developed, it will give our structural engineers an option to recommend to our clients that will save them thousands if not tens of thousands of dollars in post applied waterproofing and replacement of deteriorated concrete structures. For structural engineers it really opens up a new industry for consideration in the specification of construction materials."

It will be interesting to see how this "self-healing" concrete evolves, and you can bet the team at McNeil Engineering will be watching the process every step of the way.

Technology is pretty amazing, don't you think? For more information: <http://www.cnn.com/2015/05/14/tech/bioconcrete-delft-jonkers/index.html>

"There are no secrets to success. It is the result of preparation, hard work, and learning from failure." Colin Powell



The Practice of Landscape Architecture

The practice of landscape architecture is more than putting a tree here and some bushes and flowers there. It includes planning and designing the use, allocation, and arrangement of land and water resources through the creative application of biological, physical, mathematical, and social processes. While the name may be somewhat confusing, clear differences exist between landscape architecture and the other design professions.

Architects primarily design buildings and structures with specific uses, such as homes, offices, schools, and factories. Civil engineers typically apply technical and scientific principles to the design of city infrastructure such as roads, bridges and public utilities, as well as private projects. Landscape architects perform professional work in planning and design of the land for human use and benefit. Based on analysis of environmental, physical, social, and economic considerations, they produce overall guidelines, reports, master plans, conceptual plans, detail designs and construction oversight for landscape-type projects.



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McNeil Engineering's Landscape Architecture team is second to none when it comes to meeting your landscape design needs.

Landscape Architecture Project



Tierra Rainbow Professional Business Park, located on Rainbow Boulevard in southwest Las Vegas, consists of over 91,000 s.f. of office and retail space. McNeil Engineering's Principal Landscape Architect was hired by the developer, Great American Capital, to provide all necessary landscape planning and design services. The landscape design team worked closely with other members of the project team and was responsible for generating schematic designs and construction documents for all the proposed landscape improvements as well as accent paving in the vehicular drives and pedestrian walkways.

The vision for the site was to not only create an eye-catching design that drew the attention from passers by along busy Rainbow Boulevard, but to create a design that was water-wise and sensitive to the dry desert climate. The main entry into the site was accented with colored concrete pavers and lined with 25-foot tall Date Palms to visually highlight the primary access and to create an inviting feel for the visitors as well as the tenants.

FUN FACT

Engineers design and create water slides...Civil engineers design pumping systems to circulate just the right amount of water to a slide's pitched chute or flume. Without the right flow of water, there is no ride.

Additionally, structural engineers design the slide and its supporting frame to withstand the weight of people, the weight of the water and even the force of the wind blowing against it.

McNeil's Own Spartan Racer—Dave Draper

For those of you that have never heard of the Spartan Race, it's more than a race, it's a challenge. Spartan has three levels of races ranging from 3+ mile to 13+ mile and 20 to 30 obstacles. These obstacles consist of mud, barbed wire, walls, rope and fire. Spartan racers push their mind and bodies to the limit.



Gritty, resilient, passionate are words used to describe Spartan racers. These are words that co-workers would use to describe Dave Draper, McNeil's own Spartan racer. Dave works in our Survey Department. He travels around the country to participate in races throughout the year.



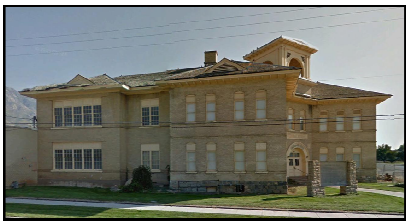
Most recently Dave participated in a race right here in his own backyard. On June 27th he ran in the Salt Lake Super Race located in Midway, Utah.

When asked why he puts himself through this, Draper says, *"I love the feeling of pushing myself to see just how far I can go. There's no better feeling than the one you get when you cross the finish line, tired and dirty, and know you did it."*



What's it Like to In-spect the Attic of A One Hundred Year Old Building?

Two of our engineers in our Structural Department had the chance to find out. While completing a structural analysis of the historic Santaquin Museum, Tevi Lawson and Michael Ekenstam, had the joyous opportunity to enter the attic for inspection. According to Lawson this was an experience he would never like to repeat again.



Lawson had this to say about the conditions in the attic: *“Even wearing a mask the smell was horrible. Bats were flying around our heads and there was a hundred years worth of bat and bird poop all over the floor and trusses.”*

Both Lawson and Ekenstam agree, as long as there are buildings to inspect, there will always be those dark, dirty attics to enter and both felt honored to be a part of the preservation of such a historic building. Until next time!!!

This was one of those real team projects. Our Survey Department performed a laser scan of the entire structure, while our Structural and Roofing Consulting teams performed the structural, seismic and roof analysis—GO TEAM!!!




Employee Anniversaries this Quarter		
Employee	Date Started	Years of Service
Rodney Davis	8/1/1983	32
Brian Warner	8/4/2003	12
Robert Poirier	8/2/2004	11
Ted Didas	9/6/2005	10
Dennis Kent Withers	7/9/2012	3
Henry Fox	8/11/2014	1

Flying Robot Builds a 3D Model and Guides Itself

Researchers have developed an unmanned aerial vehicle that can fly itself. Taking 3D scans of its surroundings, the drone can process that data fast enough to navigate in real time, without hitting objects. The scans are accurate enough to use for other purposes, too, such as infrastructure inspection.

Typically, inspectors visit a site every 12 to 18 months and generate handwritten notes that vary in detail and accuracy. As a result, assessment of the structure over a long period of time can be quite difficult. Large-scale projects, such as the Golden Gate Bridge, introduce an element of danger. Inspectors are often required to climb cables or use helicopters. One group's solution is to take scanning to the sky. Using laser scanners, the Aerial Robotic Infrastructure Analyst (ARIA) collects 40,000 x-y-z points per second to build a point cloud of its surroundings.



Researchers draw a spatial "bounding box" around a structure, and ARIA navigates in, out, over and around the structure while staying within the box's parameters, says Luke Yoder, an institute robotics researcher.

The novelty is that ARIA can put a 3D laser scanner anywhere, Yoder says. Automated drones on the market often are used for photogrammetry, according to Yoder, but these vehicles use a GPS system to navigate and assume there are no obstacles in the way. "They fly a raster pattern as they go," he says. By quickly scanning its surroundings as it flies, ARIA can reach areas of a structure that are out of GPS range and dangerous for humans and it can come back with a 3D scan of structural breakdown. This system gives you a complete point cloud without holes—and quickly.

Civil engineers used light detection and ranging, or LiDAR, and a drone to study the damage from two EF4 tornados that ripped through Pilger, Neb., last year. The goal was to improve engineering by creating an algorithm to predict a structure's weaknesses.

Great NW200 opening for sportsman supported by Laser-Scanning Europe (LSE)

Horst Saiger, an Austrian motorcyclist, achieved a respectable placement at the first races of the NW200 competition. The NW200 (North West 200) is a traditional road motorcycle race and the largest outdoor sports event in Northern Ireland. The race circuit is not permanent, but rather the races take place on dedicated roads. The motorcyclists need steady nerves to drive a race at top speed through villages and tree avenues.



The NW200 and the legendary "Isle of Man TT" are the single motorcycle races of the world at which even 1000-cc racing motorbikes can max out completely. Top speeds of more than 320 km/h (200 mph) are reached there. Horst Saiger, who lives in Liechtenstein, is currently the best German-speaking road racer; almost all other drivers come from England or Ireland. "Road racing" and the local drivers are very popular in Northern Ireland.

Since Horst cannot keep up financially with the partially supported teams from BMW, Suzuki and Honda concerning his engine, we (LSE) try to compensate the missing engine performance at high-speed straights by using improved aerodynamics. Our **laser scanning** experts have **scanned** Horst on his motorbike, and the aerodynamic flow simulation is currently in process. Our analyses haven't already yet finished, but we hope to get the first results soon.

We wish Horst all the best for the next races.

We've Come Along Way...

From this...



To this...



And this...



To this...



From gathering one survey data point at a time to more than **50,000 x,y,z** data points per second. By now you're probably thinking that's really cool but, what does it mean to me.

For the past several years, McNeil Engineering has been leading the state of Utah in the use of laser scanning services. This relatively New Technology has allowed us to complete projects in a more **timely** and **cost effective** manner. Gathering more information than ever before. Giving you the ability to bring the **entire site to your computer**.



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Laser scanning technology gives you the ability to design from extremely **accurate** reference documents. This takes the **guesswork** out of design and gives you the ability to make **educated design decisions**.

Check out the [project video](#) where **laser scanning** technology was used to capture detailed topographic information for future expansion of the Jordan River trail system. The scan also collected and showed the extensive overhead power lines.

Structural Engineering Project

The **Sugarhouse Crossing** project is a mixed use structure. It has 3 Levels of below grade parking, one level at grade commercial, with 5 Levels of apartments (200 total). The design team used Revit software to create an analytic model for complete Building Information Modeling (BIM).



The project was constructed with post tensioned floors for the parking and commercial areas with concrete walls and columns and 2x timber walls with plywood web joists for the upper floors and prefabricated trusses for the roof structure.