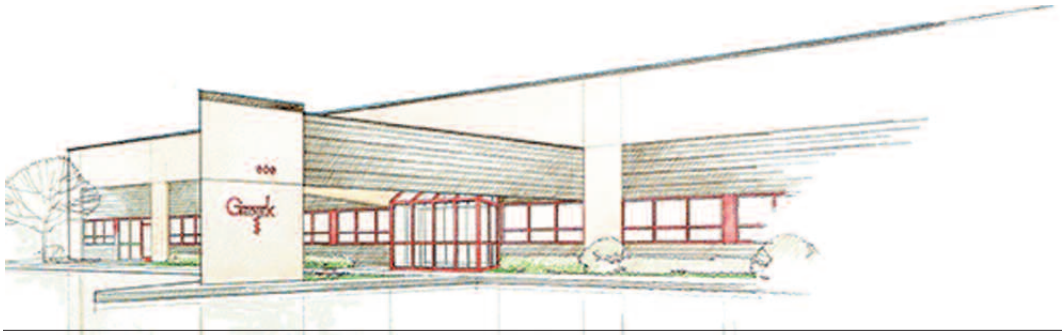

GEOTECHNICAL • CONSTRUCTION MATERIALS/NDT • ENVIRONMENTAL TESTING • INDOOR AIR QUALITY

BUILDING DEMOLITION AT SOUTH DAKOTA HUMAN SERVICES CENTER

One project that has been in the news lately is a large building demolition project at the South Dakota Human Services Center in Yankton, SD. The facility is a psychiatric and chemical dependency hospital operated by the State of South Dakota, and was established in the late 1800s. The campus is comprised of many buildings on about 220 acres. The buildings being demolished were for medical services, patient rooms, staff dormitories, barns, and farm buildings.

As it was deemed too expensive to renovate the many existing old buildings, the 1992 legislature authorized money to construct new hospital buildings. The new hospital buildings were completed in 1996. Many of the older campus buildings were used for miscellaneous storage over the years. However, as these buildings were no longer used, functionally obsolete, not compliant with disability access requirements, and in poor condition, demolition became necessary. There simply was not enough taxpayer dollars to adequately maintain the many vacant buildings. Over the years, attempts were made to entice businesses to occupy, lease or purchase select buildings, but a deal never materialized. Eventually, the 2013 legislature provided money to demolish the vacant buildings.

Now, many buildings are being demolished on the campus: two staff dormitories, three patient buildings, a (very large) administration building, three barns, a slaughter house, a tall smokestack, a large root cellar, and many utility tunnels.

Bids for the demolition work were solicited, and a contract was awarded to Runge Enterprises of Sioux Falls, SD to complete the demolition work. The contract is to be completed by September 2014. GeoTek Engineering & Testing Services, Inc. has been involved in bidding the demolition and abatement work, design of the rubble pit, hazardous material characterization, and contract oversight.

Over the years, the buildings had previously been inspected for asbestos containing building materials, and some asbestos materials had been removed. The dated asbestos surveys were verified, supplemented with additional bulk sample analysis, and remaining materials quantified. Bids were solicited from asbestos abatement firms for two rounds of asbestos removal. After contract award, many asbestos building materials such as pipe insulation and damaged floor tile were removed by asbestos abatement crews. Both asbestos abatement contracts are now complete.

Prior to demolition, hazardous materials needed to be identified and removed. Other hazardous materials (besides asbestos) that had to be addressed included fluorescent light bulbs and ballasts, mercury items such as thermostats, appliances, electric transformers, oil in hydraulically-operated passenger elevators, ash in a smokestack and incinerator, etc. J & J Contracting from Shoreview, Minnesota was hired by the general contractor (Runge Enterprises) to remove, containerize, and transport bulbs, ballasts, thermostats, and other items to permitted facilities for disposal. The ash in a smokestack and incinerator were sampled and analyzed to properly characterize it for disposal. After it was determined that ash was not a hazardous waste, the ash was removed and transported separately to a local municipal solid waste landfill. GF Electric disconnected and removed

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VOLUME 2, ISSUE 1

SUMMER 2014

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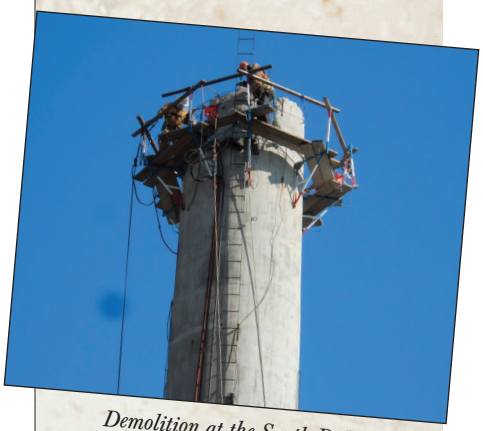

Demolition at the South Dakota Human Services Center in Yankton

Understanding Expansive Soils

Expansive soils are soils that can experience an expansion or contraction with a change in the moisture content of the soil. This expansion or contraction presents a hazard to any type of building, roadway or improvement constructed on top of expansive soils. Expansive soils pose a considerable hazard to lightly-loaded buildings and roadways because these structures cannot exert sufficient pressure to counteract the uplift pressure from the expansive soils.

Each year, expansive soils cause billions of dollars in damage in the United States. The damage can range from minor cosmetic and aesthetic concerns, such as jammed doors and windows, to major structural damage. In some instances, buildings have been deemed structurally deficient. The damage usually occurs at a very slow rate because the expansion or contraction occurs over a long period of time.

Generally, the damage is caused when expansive soils swell. The swelling occurs when the expansive soils increase in moisture content. The increase in moisture content can be caused by a variety of factors, such as climate, changes in surface drainage, changes in subsurface water levels, leaky plumbing, irrigation of lawn and landscaping, along with many others. Most of these factors are uncontrollable or difficult to control or predict. Though most of the damage is caused when expansive soils swell, damage can also occur when the expansive soils shrink. A decrease in the moisture content can be caused by changes in subsurface water levels, dry climate and trees or shrubs with aggressive roots.

An experienced geotechnical engineer can usually identify expansive soils based on a visual examination. Expansive soils typically have a "greasy" or "sticky" feel when wetted. When dry, expansive soils can be identified in the field by distinct

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What is an Industrial Hygienist?

Even before the passage of the Occupational Safety & Health Act in 1970 (which established the Occupational Safety & Health Administration (OSHA)) there has always been awareness that some occupations can be inherently dangerous. As far back as 400 BC, Hippocrates, the father of modern medicine, wrote about the toxic effect of some metals on miners. Considered to be the father of occupational medicine, Bernardo Ramazzini (1633-1714) is attributed with the following quote: "When a doctor visits a working-class home he should be content to sit on a three-legged stool if there isn't a gilded chair, and he should take time for his examinations, and to the questions recommended by

Hippocrates, he should add one more – **what is your occupation?"**. From this awareness, the science (and art) of industrial hygiene originated.

Today, industrial hygiene is generally defined as: "The art and science dedicated to the anticipation, recognition, evaluation, communication and control of environmental stressors in, or arising from, the work place that may result in injury, illness, impairment, or affect the well-being of workers and members of the community". The required skill set for an industrial hygienist is very broad and includes disciplines such as; chemistry, toxicology, epidemiology, ergonomics, engineering controls/ventilation, IH program management, physics (noise, ionizing and non-ionizing radiation), as well as many others.

Ok…so what does an industrial hygienist do? An industrial hygienist can identify health and safety problems in the workplace and conduct work

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Phase I Environmental Site Assessments

What is it? Phase I Environmental Site Assessments (ESAs) are performed to identify environmental concerns attributed to current and past property uses, and to determine liability and business risk related to environmental issues on a property.

Who completes them? According to ASTM E1527, only qualifying environmental professionals may sign off on a Phase I ESA. An environmental professional must have a state or tribal issued certification or license (e.g. Professional Engineer's license or Professional Geologist's license) and three years of relevant full-time work experience, a Baccalaureate degree or higher in science or engineering and five years of relevant full-time work experience, or ten years of relevant full-time work experience.

Why are they completed? Buyers or lenders may complete a Phase I ESA prior to closing on a property to complete due diligence. Without due diligence, a buyer or lender could be liable for all environmental issues and clean-ups at the subject property. Only Phase I ESAs

provide CERCLA Landowner Liability Protection.

What is included in the report? A Phase I report includes a site visit to the property, a review of historic property information, a review of contaminated properties in the site vicinity, and interviews with the owner or site manager, and a local government official. The historic property review includes looking at topographic maps, aerial photos, county atlases, city directories, and fire insurance maps. The review of properties in the site vicinity involves searching state and federal databases for properties or companies of concern in the site vicinity.

Why choose GeoTek Engineering? GeoTek employs numerous environmental professionals that have extensive local knowledge and experience to ensure due diligence is done completely and efficiently. Our environmental professionals have over 200 years of combined experience and have completed over 1500 Phase I ESAs in South Dakota, Iowa, Minnesota, and Nebraska. In addition to due diligence, our environmental professionals are versed on a variety of environmental concerns including lead, asbestos, mold, and petroleum contamination. If contamination is suspected on a property, GeoTek has three hollow stem auger drill rigs and a Geoprobe machine for gathering soil and groundwater samples to determine if there is contamination, and the extent of it.

As the World is Round, Floors are Flat… and are now Becoming Flatter

I am sure everyone who has or is involved in concrete construction has heard the saying "we need a 1/8 inch in 10 feet". Well, the old standard of measuring floors with a 10 foot straightedge is now being taken over by Floor Flatness (FF) / Floor Levelness (FL) numbers, utilizing a digital F-Meter or D-Meter. This technology lets you measure floor flatness with speed, precision and incredible accuracy.

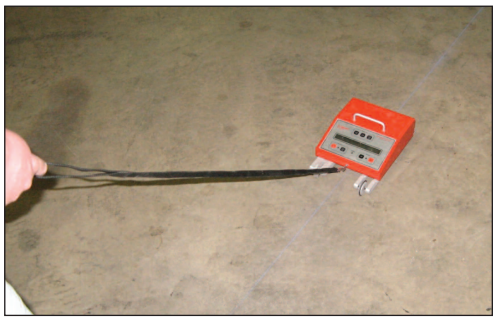
The F-Number System (ASTM E-1155) is the American Concrete Institute (ACI 117-10) and Canadian Standards Association (CSA A23.1) required methodology for the specification and control of concrete floor flatness and levelness. F-Numbers replace all forms of the traditional "gap under the straightedge" type tolerance, since these formats – regardless of wording – are known to be inherently illogical, and as a consequence, legally unenforceable. The rules for collecting the F-Number data, making the F-Number calculations, and reporting the F-Number results are set forth in ASTM E-1155: Standard Test Method for Determining FF Floor Flatness and FL Floor Levelness Numbers.

Simply put, the FFlatness numbers control the floor's local bumpiness and the FLevelness numbers control the floor's local inclination relative to horizontal. The higher the FF and FL numbers, the better the floor's flatness and levelness.

GeoTek has provided floor flatness testing services since 2007. In the summer of 2013, GeoTek had the opportunity to work on a couple of major projects where floor flatness and levelness was of importance.

The Animal Health Facility was constructed in Sioux Falls, SD by Jans Corporation. The facility is a 54,000 square foot warehouse and distribution center that specializes in animal health products and supplies. Due to the height of the racking system that would be used, the floor slab specifications called for fairly high requirements for floor flatness (60) and floor levelness (45). Jans Corporation's subcontractor, Limoges Construction, had the opportunity to put their brand new laser screed to work and finished the project with overall success.

GeoTek was contracted through Ferguson Construction to perform the FF/FL testing on the new Costco warehouse in Sioux Falls, SD. This project involved construction of an 180,000 square foot building for a high end big box retailer that will employ approximately 120 full and part time employees. Once again, the floor slab specifications called for fairly high requirements for floor flatness (50) and floor levelness (40). Ferguson Construction exceeded these requirements, in some cases by more than 50% for flatness and levelness, respectively.



What is an Industrial Hygienist?

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place sampling for stressors such as chemicals, noise and heat/cold stress that may be adversely affecting employees. Industrial hygienists may also be asked to develop or recommend corrective measures to improve hazardous conditions once identified and develop safety programs to promote best practices and maintain adherence to state and federal regulations. Because of the broad skill-set of industrial hygienists, they are often tasked with duties not ordinarily associated with industrial hygiene such as environmental assessments/investigations, accident investigations and residential indoor air quality issues, just to name a few.

The American Board of Industrial Hygiene (ABIH) is the certifying board for industrial hygienists. In order for an industrial hygienist to become board certified, he/she must meet the educational and experience requirements as set forth by the ABIH prior to sitting for a written examination. Board certification is comparable to an engineer earning a P.E. or an accountant receiving the CPA designation. The CIH designation (Certified Industrial Hygienist) is currently recognized throughout the United States and many other countries around the world as the gold standard in the field of industrial hygiene.

Please contact Mr. Jason Cook, CIH, for any questions you may have, or for a specific project quotation.

Understanding Expansive Soils

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shrinkage cracks. In the laboratory, expansive soils can be identified by performing an Atterberg limits test or a swell test. These tests also help determine the expansive potential of the soils, thus helping the geotechnical engineer develop preventive measures to mitigate the potential hazard.

Once the expansive potential has been determined, various design alternatives and preventive measures can be considered to reduce the potential impact of expansive soils. Some of these design alternatives and preventive measures include the following:

- Removing the expansive soils;
- Providing a buffer of non-expansive soils between the expansive soils and the buildings, roadways or other improvements;
- Installing a deep foundation system consisting of drilled piers and grade beams, along with a structural floor system and a void space beneath the floor;
- Extending the building foundations beneath the zone of moisture content fluctuation;
- Avoiding placement of high water demand vegetation near the structure;
- Providing exaggerated finished grades around the perimeter of the structure to allow for accelerated drainage away from the structure.

Understanding the expansive potential of soils is very important to a successful project. By understanding the expansive potential of soils, engineers can include alternatives and preventive measures in their design. The precautions used during the design and construction of a project could potentially save owners money and headaches.

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Building Demolition at South Dakota Human Services Center

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several electrical transformers. T & R Electric sampled the oil within transformers, tested for Polychlorinated Biphenyls (PCBs), and later collected non-PCB transformers for refurbishment or salvage. A few PCB-containing transformers were collected by other vendors for off-site disposal at permitted facilities. Some old medical/lab supplies (i.e. mercury, acids) remained in the buildings and were also properly disposed at a permitted off-site facility.

There is an on-site rubble pit (permitted by the State of South Dakota) being used for disposal of rubble. However, the permit does not allow municipal solid waste, regulated asbestos, or other hazardous materials to be disposed of in the rubble pit. Where feasible, Runge Enterprises is recycling concrete from the buildings and paved areas, and salvaging structural and other steel components for recycling.

Previously, the facility had a central heating plant, so there are many underground steam pipe tunnels. Thousands of feet of these tunnels between buildings are also being removed. Electrical services to area street lights and remaining buildings, as well as driveways, are also being reconfigured.

However, where feasible, some older buildings are being retained. One exceptional building (Mead Building) is being renovated into a new location for the Dakota Territorial Museum. In 2012, a 20 year lease with the option to buy was signed between the State of South Dakota and the Yankton County Historical Society. The Mead Building was named after Dr. Mead, an early superintendent of the facility. Dr. Mead's philosophy was that beautiful surroundings were essential for patient health and recovery. Among other ornate architecture, this building has a marble staircase! Roof restoration work has been completed, and other restoration work continues on the building. Two other buildings (Calf Barn, Burbank) in fair condition have also had new roofs installed in 2013, to keep them enclosed from weather. And, one other campus building (Kanner) was converted to a state office building about 20 years ago. This building was dedicated in 1980 to a former psychiatrist at the facility, Dr. Leo Kanner, who first identified autism in children.