The Barn Raiser

Mid-South Engineering Company

Issue No 13 Working Together First Quarter, 2005

## What's Below the Surface?

Karst is a term used to describe an area where limestone bedrock has eroded in an irregular manner. This irregular erosion is caused by the dissolution of the limestone which occurs as water is transported through the rock. As a result, these areas are often characterized by extremely variable rock surfaces, solution channels, sinkholes, and caves.

Developing and building in Karst environments often provides for many challenges and risks not encountered in other geologic environments. The unpredictability of the subsurface conditions frequently makes planning and construction at a site more challenging.

There are several things that can be done to help reduce the risks associated with development in Karst environments. A site investigation, including a detailed geologic review, fracture trace analysis, and traditional subsurface investigations, can help identify areas of a site with existing solution conditions and areas that are at a higher risk of developing solution features. By conducting this investigation very early in the design process, it may be possible to design the site to avoid high risk areas.

More specific subsurface investigations may be conducted to provide more detailed information regarding the presence of solution features and the rock elevations within the proposed construction areas. Features that impact the site may then be mitigated by methods ranging from a deep foundation system, to a pressure grouting program, or to a simple plug repair of the solution feature.

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## NEC Tap Rules

Powering a piece of equipment requires properly sized wiring and an adequate source of power – requirements, which without careful forethought are easy to violate. At home many people seem to end up with a proliferation of extension cords run to the closest available outlets not realizing that in the process, rules regarding wire gauge, ampacity etc. may be inadvertently violated. Multiple cords may be plugged into a common power strip without regard to the ampacity of the power strip. It is common knowledge that such unsafe practices result in a large number of electrical house fires every year. Unfortunately and all too often such "extension cord" mentality is seen at work even in industrial installations. The results are Code violations with the potential to cause catastrophic failures resulting in loss of property and injury to personnel.

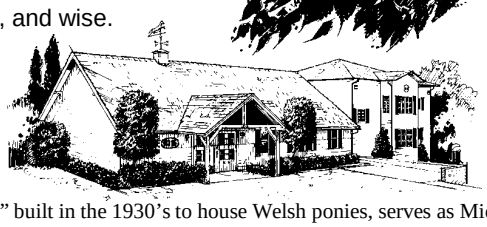
When a new transformer, MCC, motor or other industrial device is to be powered there is the temptation to "tap" into the closest available source of power in ways ranging from overhead wiring and exposed feeders to switchgear or MCC buses. While this may be acceptable under specific circumstances, compliance with the specific code rules is both mandatory and wiser.

Section 240-21 of the National Electrical Code (NEC) states that over current protection shall be provided in each ungrounded circuit conductor and shall be located at the point where the conductors receive their supply. The same section however provides for specific exemptions if certain conditions are met. For instance a tap not exceeding 10 feet in length [NEC 240-21(b)(1)] is allowed if the ampacity of the tap conductor is:

(1) Not less than the combined computed loads on the circuits supplied by the tap conductors, and

(2) Not less than the rating of the device supplied by the tap conductors or not less than the rating of the over current protective device at the termination of the tap conductors.

There are different conditions for taps not exceeding 25 feet [NEC 240-21(b)(2)], taps supplying a transformer primary [NEC 240-21(b)(3)], taps over 25 feet [NEC 240-21(b)(4)], and outside taps of unlimited length [NEC 240-21(b)(5)]. A thorough understanding of these rules is a pre-requisite to achieving safe installations that are in compliance with the National Electrical Code, and wise.



"The Barn" built in the 1930's to house Welsh ponies, serves as Mid-South's offices.

Due to the irregularity of Karst environments, even the most extensive investigation cannot fully eliminate surprises from occurring during construction. As such, it is important to maintain regular communication with the geotechnical engineer regarding conditions encountered during construction.

One important factor to consider during the design and construction phase of any project in a Karst area is the control of surface water and storm water at the site. Many sinkholes form where water is allowed to enter the subsurface at one location. Infiltrating water can also lead to solutioning and sinkhole formation well downstream of the point of entry due to the connected nature of limestone bedding and fracturing. It is important to design and implement controls to avoid excessive infiltration of water.

No one can see what might be hidden underground, just under the surface, but a good plan and geotechnical survey is always a recommended action to avoid problems like Karst.

## Leading and Change

History is full of examples of dynamic leaders who are able to get followers to do both the right and wrong things. Unfortunately, doing the wrong thing happens a great deal in industry today. Frequently, leaders do not recognize that they are leading in the wrong direction because they're reacting to a new business environment in old, comfortable ways that don't match the direction their company needs to make to be successful in the future.

We all have a strong tendency to react to situations based on what we believe served us well in the past. Good leaders must understand the current situation; otherwise, they are unable to see possibilities beyond their preprogrammed viewpoint.

Understanding our tendency to adhere to past ways of reacting is the first step in progressing toward a better path for the company's future. We must then take those difficult steps outside our comfort zone.

In order to do this, leaders must know how their old habits restrict their flexibility. Good leaders often struggle with this…especially in today's initiatives for streamlined enterprise principles and techniques. Technology is constantly changing to affect our industry and this technology comes with shorter and shorter durations before the next upgrade. Old slow paced programs to study the situation before taking any real action can appear to be a step forward when actually they are simply ways to march in place while our competitors move past us. This is what one person once called, "fixing to get ready to commence to begin".

Unfortunately, a lot of organizations are "fixing to get started". But they have no idea of the next step to be taken or the needed changes to allow them to progress forward. Time becomes as much of a factor as any other aspect of a project. Slow times are often the best time to "re-tool" so that you are ready when your customers are demanding your product or services.

Leaders who see through the fog and become conscious of the real static in a seemingly dynamic set of activities will be able to take appropriate actions. Seeing and understanding the filtering mechanisms of others is the second step in overcoming inertia and understanding how to lead others to make beneficial changes. Leaders must change minds before that can get people to change the way they do things.

In order to do this, leaders must help people in the organization realize how the proposed changes will result in benefits beyond those they currently enjoy – increased competitiveness, job security, financial gains, growth, etc. That might seem easy enough, but it takes work, persistence, early demonstrations of success, and leadership by example. Early successes must be publicized to encourage your followers for their participation and action.

To be a good leader, do not automatically react to changes as you always have. Try to understand people and how to influence their behavior.

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