

Gateways

Information from Gateway Geotechnical, LLC

December 2014
Volume 8, Issue 2

IN THIS ISSUE

**How Do We
Determine the
Seismic Site Class?**

Wade A. Mathes

**Obscure Engineering
Conversation Factors**

IT'S YOUR TURN

Are you dealing with or have questions about a geotechnical issue? If so, send us an [email](#).

We'll get you the solution!



Gateway wishes you and your family
a wonderful holiday season...

Merry Christmas and Happy New Year.

Take time to be together. You never know when
you won't have another opportunity.

And a sincere **THANK YOU** for opportunities
you have given *Gateway Geotechnical*
this past year!

How Do We Determine Seismic Site Class?

In recent years, the determination of the seismic site class has caused a lot of discussion among the local geotechnical community, reviewing agencies, and the clients we serve. Most of the area currently utilizes the 2009 IBC Code (ASCE 7-05), including St. Louis and Jefferson Counties. We understand that St. Louis County anticipates updating to the 2015 IBC Code, but obviously has not yet done so. Jefferson County will likely follow Saint Louis County's lead.

The first step in determining the Site Class is characterizing the site's soil and rock stratigraphy and consistency (strength). This is done in several ways, the simplest being using the Standard Penetration Test (N values in blows per foot) obtained during the drilling and sampling exploration. If there are enough laboratory strength tests available, such as unconfined compression (or from more sophisticated testing procedures) on Shelby tube samples, these can also be utilized for comparison. The IBC and ASCE documents require the weighted average of these values for the upper 100 feet, but typically far less depth needs to be explored – either due to encountering bedrock at shallower depths and/or

relying on estimated properties based on geologic conditions known to the design professional, i.e. local experience.

The Site Class can vary from A to F, increasingly becoming more critical. Site Class F is for liquefiable or collapsible soils, more than 10 feet of highly organic clay or peat, more than 25 feet of highly plastic clay, or more than 100 feet of soft to medium stiff clay – conditions not generally present in the St. Louis area. Site Class E is for sites with more than 10 feet of soft clay, including some of our deeper filled stream channels and alluvial areas. D and C Sites, which are increasingly more dense and stiff, are our most common Site Classes, and are present across most of the St. Louis area. Site Class D is typically the default value for sites with insufficient data.

So, areas with a Site Class D are more susceptible to earthquake damage than those in Site Class C. Consequently, structures in the more critical Site Class D areas will require additional reinforcement and cost more to construct. However, it is important to remember the purpose of this entire exercise, which is to provide for the safety and welfare of occupants during a seismic event, taking into account the site's subsurface conditions, and that is a good thing for all of us.

Finally, shear wave velocity testing can be used to define the Site Class. We have found that this geophysical method often leads to a more favorable classification, perhaps C rather than D. There is, of course, additional cost on the order of \$5,000 or a little more, but this could be much less than for the more substantial designs required with the more stringent Site Class D – particularly for complex, medium or high-rise structures. Site Classes B and A, defined as rock and hard rock respectively, cannot be used without shear wave velocity testing.

Gateway Geotechnical has successfully performed shear wave velocity testing on a number of sites across Missouri.

WADE ANDERSON MATHES
October 27, 1975 – November 27, 2014



Wade was Gateway's most-senior geotechnical technician. He was with our firm for nearly all of our eight-plus years, and was the backbone of our construction services. He was killed in an automobile accident near his home in Augusta on Thanksgiving morning. At only 39 years of age, he leaves behind his wife Marci and three young boys – Lucas, Elijah, and Abel.

We are honored to have known him and to be his “other” family, and our firm will never be the same. Rest in peace Wade.

OBSCURE ENGINEERING CONVERSION FACTORS

On the lighter side, here are a few that you might try out on your friends. Source unknown.

Ratio of an igloo’s circumference to its diameter = Eskimo pie

2,000 Pounds of Chinese soup = Won ton

1,000,000 Aches = 1 Megahurtz

365 Days of drinking low-calorie beer = One lite year

1 kilogram of falling figs = 1 Fig Newton

More in our next issue - - -

Gateways is published by:

Gateway Geotechnical, LLC
17736 Edison Avenue
Chesterfield, Missouri 63005
Telephone: 636-532-7747
Fax: 636-537-0090
www.GatewayGeotechnical.com

Send comments/suggestions to:
info@GatewayGeotechnical.com

© 2010 Gateway Geotechnical, LLC

Gateway Geotechnical is a 100% veteran-owned small business (VOSB)

