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CONSULTANT'S UPDATE

ISSUE 24

APRIL—JUNE 2007

A "GREEN BUILDING" IS NOT NECESSARILY GREEN

By Suzanne S. Hunnicutt, AIA



Most people realize that, when they hear someone refer to a "green building", they are not talking about the color of the paint. However, they may not know exactly what a green building is. Many believe it simply means that a building is energy efficient. While energy efficiency is an important aspect of being "green", it is not the only criteria. "Green Building", "Sustainable Design", "LEED Certified", ...all of these terms are related, but they are not necessarily interchangeable.

So what is a "Green Building"? According to the definition used by the U.S. Green Building Council, a green building is one that significantly

reduces or eliminates negative impacts on the environment and on the building occupants. "Sustainable design" is the means of achieving a green building, and refers to the ability of the earth to "sustain" continued development of this type without depletion of essential resources. While the exact characteristics of a green building are often debated, there are six fundamental principles on which nearly everyone agrees.

- Sustainable site development: starts with proper site selection and addresses how the location, orientation, and landscaping of a building affects the local ecosystem, transportation methods and energy use.

(Green Buildings—Continued on page 3)

CONCRETE: AN ALTERNATE FLOOR FINISH

By Paul H. Racette, PE



Concrete surfaces are no longer being viewed as a "substrate only" layer for floor coverings in commercial, industrial, and institutional buildings. In the past, concrete has traditionally been covered with a wide variety of materials, including ceramic tile, wood, vinyl tile, carpeting and more. Bare concrete, however, is now being considered as a viable flooring option along with other standard floor coverings.

There are multiple reasons for the resurgent use of bare concrete. Specifically, multiple new look and design options have made bare concrete an extremely versatile and attractive option. Some of the design options that "decorative concrete" offers include color staining, artistic dyes, polishing, stamping (to appear like tile, brick, etc.), scoring and sawcutting, embedded etched logos,

and more. From a practical standpoint, colors can be utilized to designate different areas within a space, along with colors and textures mixed and matched for graphic interest. Also for a "regional" feel, exposed rock (aggregate) that is typical to the geographical region can be incorporated within the concrete surface. This option is more often used in driveways and patio settings.

Additional good news is that these options are not relegated to new construction surfaces only. Decorative concrete can also be used with existing surfaces. Staining an existing floor or applying a topping that can be colored, stained, stamped, or stenciled, can infuse new life into an old concrete surface. Combining a variety of floor coverings to manage areas of different traffic is also an attractive and practical option. For example, a lobby which would typically have a high volume of foot traffic is an excellent candidate for decorative concrete.

(Concrete—Continued on page 3)

COMMUNITY SERVICE

Pearce Barrett, (Tallahassee Regional Office Manager for Chastain-Skillman) has been tapped to serve as Board Chair for the Keep Tallahassee - Leon County Beautiful Organization. Chastain-Skillman annually supports the organization with time and monetary support.

Chastain-Skillman is a Platinum Sponsor for the World Water & Environmental Resources Congress to be held in Tampa, May 15 - 18, 2007.

Inside this issue:

A "Green Building" is Not Necessarily Green	1
Concrete: An Alternate Floor Finish	1
EWRI World Congress In Tampa, May 2007	2
Censored Data: What's the Average of Unknown Values?	4

ENVIRONMENTAL WATER RESOURCES INSTITUTE (EWRI) WORLD CONGRESS IN TAMPA, MAY 2007

By Sheila Carpenter-van Dijk, E.I.



This May, environmental and water engineers and folks from all over the world who work in environmental and water related fields are expected in Tampa to participate in the

2007 EWRI World Congress - "Restoring Our Natural Habitat." The Congress will focus on habitat restoration with a dozen technical tracks covering issues from coast to coast and around the globe.

Presentations will be made by members of industry, government, and academia. Short Courses include: a Biosolids Seminar; Curve Number Rainfall-Runoff: Professional Applications; Scour Analysis for Stream Restoration Automated Tool; Treatment of Uncertainty in Water Resource Modeling; CPESC Training and Exam; and Sedimentation Engineering: Theory, Measurements, Modeling and Practice (Manual 110).

Technical Track Topics include: Air Quality Issues; Aquifer and Lake Recovery/Restoration; BMP and LID Technology; The Changing Face of the Engineering Workforce; Computational Hydraulics and Hydrodynamics; Eco-Hydraulics & Eco-Hydrology; Education and Research; Endocrine Disrupting Chemicals & Micropollutants; Environmental and Public Health Impacts of Emerging Contaminants; Environmental and Public Health Interrelationship; Environmental Permitting; Environmental Processes; Evolutionary Computation; Groundwater Hydrology, Quality, and Management; Groundwater Subsurface Remediation; Habitat Restoration Design and Engineering; Hydraulic Structures; Innovative Disasters Debris Management; Irrigation and Drainage; Phytoremediation Technologies; Planning and Management; Probabilistic Methods Associated with Environmental Restoration;

Local Group Activities; River Restoration; River Systems Operation and Management; Scour/Sedimentation; Solid Waste Management; Standards and/or Guidelines Development for Habitat Restoration; Stochastic Hydrology and Frequency Analysis in Water Resources; Sustainable Development Approaches Through Water, Wastewater, and Stormwater Engineering and Science; Urban Stream Restoration; The Changing Face of the Engineering Workforce; Water Desalination & Concentrate Management; Water Re-Use Including Re-Use of Treated Waste Water; Watershed Management and Restoration; Wetlands Restoration.

In addition to the technical sessions, technical tours are planned for participants with "Lifestyle" tours for guests and spouses to show off Tampa and the Sunshine State. Planned technical tours include trips to Tampa Bay's Desalination Facility, Surface Water Treatment Plant, new Reservoir, and the Howard F. Curran Advanced Wastewater Treatment Facility. We have also planned an all-day excursion to view areas related to restoration of areas in the Florida Everglades. There may be an airboat ride in your future if you sign up for the Saturday Tour. We also plan to visit the Fred & Idah Schultz Nature Preserve, the Tampa Bay Estuary, Cockroach Bay, and see firsthand the phosphate mining process, and a restored mining area of Mosaic Fertilizer, LLC.

Lifestyle tours include a canoe trip down the Hillsborough River. This tour includes a stop for a barbeque lunch and presentation by the Hillsborough River Greenways Task Force (<http://www.hrgtf.org/>) at Nature's Classroom, Hillsborough County's 365-acre pristine outdoor classroom on the river.

Also planned is an Outreach to local students at the Florida Aquarium (<http://www.flaquarium.org/>). For the first time ever, the 2007 EWRI Congress will in-

clude an outreach program that brings together professionals, university students, and 100 kids from local Tampa bay area schools in grades 3-12. The goal of the activity is to inspire and encourage students to pursue careers in engineering with a particular emphasis on environmental fields and applications. Professionals in the water and environmental fields are encouraged to volunteer as mentors for this activity. If you would like to volunteer as a mentor for this half day program, please contact Sheila Carpenter-van Dijk (813-621-9229, scarpen@chastainskillman.com).

Chastain-Skillman staff is very active in EWRI. Paul Bizier is the 2007 Congress General Chair, fulfilling this commitment for the second time, as well as being the ASCE President's Representative to the EWRI Governing Board. We have several technical committee chairs including Jim Chastain (Public Health), Doug Jones (Water Supply Engineering), and Karen Karvazy (Water Pollution Engineering). Sheila Carpenter-van Dijk, in addition to being the 2007 Congress Local Arrangements Chair, is also secretary of the Sections and Branches Activity Council of EWRI.

Registration is open. Go to the Congress website for more information. You can also sign up on line: <http://content.asce.org/conferences/ewri2007/>.

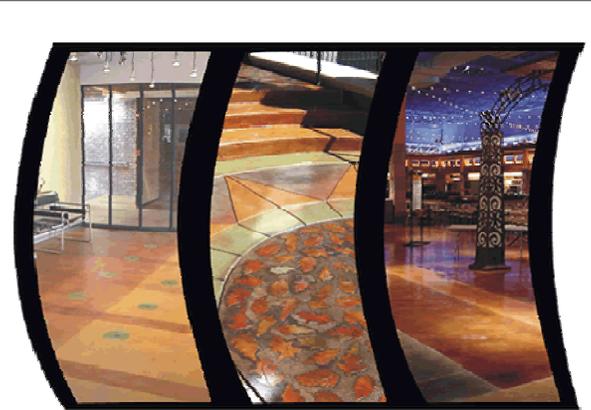
Sheila Carpenter-van Dijk is a Project Manager in the Environmental Engineering Department of Chastain-Skillman's Tampa office. She earned a Bachelor's Degree in Civil Engineering from the University of South Florida (USF) in 1996. In 2002, she completed the Graduate Certificate Program in Desalination Technology and Engineering also from USF. Sheila is the Local Arrangements Chair for the upcoming Congress in Tampa. She can be reached at (813) 621-9229 or scarpen@chastainskillman.com

PLEASE JOIN US AS WE WELCOME OUR NEW HIRES ...

Our Civil group in Lakeland welcomes **Kevin McDowell, PE** to the staff. Kevin will be performing the duties of Senior Project Manager. Kevin is a Magna Cum Laude graduate in civil engineering and brings 10 years of experience to the firm.

(Concrete—Continued from page 1)

Business owners are also recognizing a valuable second benefit of bare concrete surfaces in the easy cleanup it affords. Compare the “soap and water” clean up for bare concrete with the additional maintenance requirements of: vinyl covering (periodic re-waxing); tile (grout cleaning); and wood (periodic finish coating and waxing). Carpeting offers its own range of maintenance and health issues including chemicals [both within the carpeting (formaldehyde) and in the cleaning products used], odors, dust mites and other substances which can create allergic reactions.



Stained/dyed concrete - Photo courtesy of Concretizen Decorative Surfaces - www.concretizen.com

Concrete offers an attractive, low maintenance, allergy free alternative. Still additional benefits to consider may include a shortened construction schedule, lower cost, and fewer health related issues.

Paul Racette is a Department Head/Senior Project Engineer for Chastain-Skillman's Structural Department in Lakeland. Paul received a Bachelor of Civil Engineering degree from the University of South Florida in 1977. He can be reached at (863) 646-1402 or pracette@chastainskillman.com.

(Green Buildings—Continued from page 1)

- **Energy Efficiency:** includes not only reducing consumption of energy, but also utilizing renewable energy sources.
- **Water conservation:** utilizes such things as drought-tolerant landscaping, low-consumption or waterless plumbing fixtures, and water reuse systems.
- **Use of Environmentally Preferable Materials:** such as products with a high content of recycled material, wood from sustainably managed forests, and locally produced materials reducing resource depletion.
- **Enhancement of Indoor Environmental Quality:** can be accomplished by maximizing daylighting, providing appropriate ventilation and moisture control and avoiding the use of materials with high VOC emissions.
- **Operational and Maintenance Practices:** can be optimized by good design and material selections as well as providing documentation and training to the building's users.

So, how “Green” is “Green”? How do you know if one building is greener than another? The only widely recognized stan-

dard for green buildings is the Leadership in Energy and Environmental Design (LEED) Green Building Rating System. LEED offers a method for having a building “certified” although critics believe the process is too onerous and the requirements too prescriptive. However, almost any building can be “greener” than the average building with just a little effort and little if any additional cost.

So, why does “Green” matter? How much effect does one building actually have? Probably not much, you could argue, but collectively buildings in the U.S. use 65% of electricity and 36% of the total energy use. They are responsible for 30% of both greenhouse gas emissions and waste output and they consume 30% of all raw materials and 12% of all potable water used nationwide. Clearly, if every new building is even a little greener, it can have a significant impact on the future of our planet.

Suzanne Hunnicutt is Vice-President of Architecture, and works out of Chastain-Skillman's Sebring office. Her work focuses on the design of office, institutional and industrial buildings for both public and private clients. Suzanne received a Bachelor of Design degree in 1975 and a Master of Architecture degree in 1980 from the University of Florida. She can be reached at (863) 382-4160 or shunnicutt@chastainskillman.com.

RECENT PROJECTS AND CONTRACTS OF INTEREST

- Chastain-Skillman has been re-certified for 2007 to submit engineering proposals for **Hillsborough** County.
- We've signed a new agreement with **Children's Home Society of Florida** to assist with IEQ related work for over 100 facilities throughout the state.
- We're providing asbestos, mold and lead-base paint abatement turn-key services for the **School District of Hillsborough County** to convert the former Tampa Federal Courthouse into an inner-city High School.
- In Avon Park, our **Sebring** office is providing Civil engineering for a new Memorial Boulevard Elementary School and the related 9,000 feet of water/sewer line.
- In Tallahassee, the **City of Tallahassee** Water Utilities has commissioned Chastain-Skillman to provide designs for upgrading various aspects of the Biosolids facilities at the TP Smith Water Reclamation Facility.

CENSORED DATA: WHAT'S THE AVERAGE OF UNKNOWN VALUES?

By James R. Chastain, Jr., PhD, PE, MPH



Monitoring plans are an essential part of effective environmental regulation and management. The essence of any monitoring plan is to identify changes in key variables and use that information to assess the condition of the system of interest. Monitoring programs generally are divided into three categories, depending on their purpose. *Baseline Studies* seek to document the current state of the environment which provides a basis for quantifying changes in the future. *Targeted Studies* are used to assess the impact of planned events or quantify the effects of past events (such as a chemical spill or natural disaster). Finally, *Compliance Monitoring* is intended to detect trends in variables of concern and to document that the source is functioning within applicable guidelines or regulations. While the objectives of these programs vary, they all depend on well-defined plans to properly sample, analyze and interpret the data.

Unfortunately, data from environmental monitoring plans is notoriously “messy” or, as statisticians say, “not well-behaved”. There are a number of reasons for this. First, environmental data is typically both temporally and spatially variable. Further, there may be numerous parameters to track and define. Also, it is not unusual for human or equipment error to result in lost or spurious data. When correlations between variables are important, these and other effects complicate the interpretation significantly. One of the primary tasks that one faces when evaluating a data set is to develop summary statistics which includes a measure of central tendency and variance. This can be difficult if the monitoring data includes a significant proportion of censored data.

Censored data most commonly occurs when the true value of the sample lies below the detection limit of an analytical test. While there are some additional subtleties [ex. Limits of Quantification, Method Detection Limits (MDL), Practi-

cal Quantification Limits, etc.] basically this means that the laboratory report comes back with a sample concentration of “not detected” or “< MDL”. In one sense, the result is probably good news because it most likely means that the system is in compliance with some stipulated standard. However, when trying to compute statistics or trends, the actual value is indeterminate. Many times it is also of interest to examine correlations between parameters. When censored data is encountered, especially in conjunction with multiple variables, the analysis becomes more complicated and prone to bias, if not error. Given the frequency that this issue occurs, what is the appropriate way to handle censored data?

The approaches can get quite complicated. For the purpose of this article, we will consider techniques that are typically used when estimating the mean and standard deviation, although they can be extended to computations of other statistics also.

To reiterate, the objective of this exercise is to determine a number that lies between zero and the MDL that can be used to compute the mean and standard deviation of a list of values. A summary of the more common approaches is as follows:

Simple substitution: this is probably the most common resolution used to address the problem. Typically, a fixed value is chosen from the interval between zero and the MDL and then substituted in any place where a censored value occurs. If zero is used, it results in a negative bias because that is the lowest value possible. On the other hand, if MDL is chosen, the analysis will have a positive bias since that is the maximum value the point(s) can assume and still be a non-detect. Many analysts, therefore, use half of the MDL to hedge the bias of selecting a more extreme value.

Direct Maximum Likelihood Estimator (MLE) methods: These methods, initially developed by Cohen, assume that the unknown values follow a given distribution and therefore can be estimated by maximum likelihood techniques. MLE techniques are fairly well documented in sta-

tistics literature. Cohen and those that followed have developed a series of tables or computer algorithms to compute the appropriate values.

Regression on Rank Order Statistics: In this non-parametric procedure, all values are rank-ordered with the “<MDL” values listed as smallest and the percentile computed for each value. The value is then plotted against its probability (z-score). Only the non-censored values can be plotted, of course but, if the resulting line is approximately straight, the censored values can be estimated by interpolation. Log transformation is also possible if the probability plot is not straight. This process is straightforward and can be adapted to a computer spreadsheet. The regression features can then replace graphical interpolation.

Robust Parametric Method: This method is similar in concept to the procedure above except that this method is a parametric procedure. That is, this method assumes that the data follows a stipulated distribution (usually a normal or log-normal form). Again, a probability plot is constructed using the uncensored data. The censored values are then replaced by extrapolated values from the fitted regression line.

Method of Proportions: Taking a page from categorical data analysis, another technique for examining the data set is to classify the data set only as “values above MDL” and “values below MDL”. This procedure is generally used when the majority (> 50%) of given data is below the detection limit but at least 10% of the observations are quantified. Because of the extreme level of censoring in this case, typically a percentile slightly greater than the proportion of non-detects is used for the confidence interval rather than the mean.

These, along with trimmed means, Winsorized means, Aitchison's Method and other tests, provide a wide array of methods to deal with this situation. This all begs the question, which test should be used?

(Censored Data—Continued on page 5)

(Censored Data—Continued from page 4)

The answer, in true statistician fashion, comes back...that depends. The method used depends significantly on (1) the total number of observations in the monitoring cycle, (2) the proportion of those tests that are below detection limits, (3) whether the distribution of the data is known or unknown, and (4) what statistics are being required (ex. means, confidence intervals, trends, etc.)

The good news is that computer programs are available to manage the tedious computations. However, it is necessary to have an understanding of the analysis options and their strengths and weaknesses in order to select the appropriate alternative. Because most standard statistical programs seldom have many of these analyses as part of their standard menu, a public domain computer program named UNCENSOR (Newman *et al*, 1995) is quite useful for those who know how to use it. The program can be downloaded from the Virginia Institute of Marine Science (College of William & Mary) website: www.vims.edu/env/research/software/vims_software.html

The User's Manual has a flow diagram that helps guide the method selection process which is shown as Figure 1.

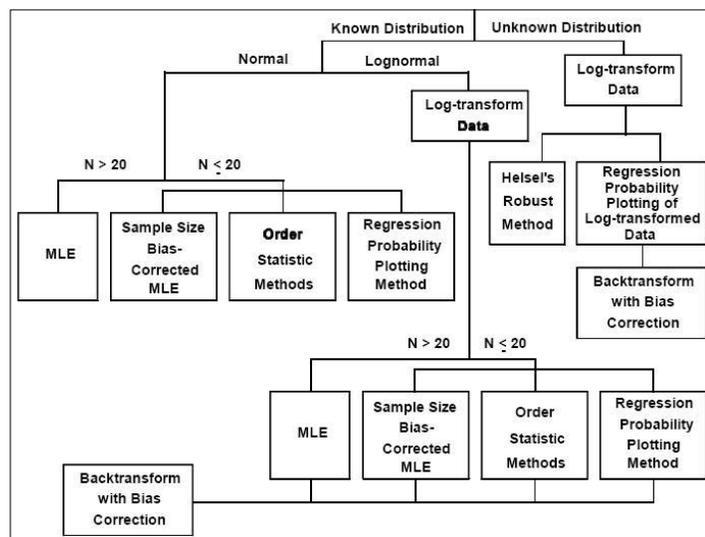


Figure 1

Practically speaking, it may not be necessary to go through an elaborate analysis for non-critical monitoring events. The Environmental Protection Agency (EPA) in some of their technical guidance has proposed a more relaxed procedure for routine analysis (USEPA, 2006). This approach suggests that the analysis method be selected on the basis of the percentage of non-detects in the data group.

Approximate Percentage of Non-Detects	Statistical Analysis Method
<15%	Replace non-detects with 0, MDL/2, or MDL; Cohen's method
15% - 50%	Cohen's method, Winsorized mean/std. deviation
> 50% - 90%	Proportions Test

The major purpose of this article is to be mindful of the fact that the handling of data below the detection levels requires purposeful evaluation.

For those using automated spreadsheets to manage their data, this topic certainly warrants a review of the computational procedure to confirm that this issue is being properly handled. Even though censored data complicates an analysis, the information should never be thrown out.

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Manly, B.F.J. (2001). *Statistics for Environmental Science and Management*. Chapman & Hall/CRC. Boca Raton, FL.
 Newman, M.C., Greene, K.D., Dixon, P.M. (1995). *UNCENSOR* v.4.0. Savannah River Ecology Laboratory. Aiken, SC.
 USEPA (2006). *Data Quality Assessment: Statistical Methods for Practitioners*. EPA/240/B-06/003. Washington, DC.
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EOH NEWS

Safety for Mold Remediation; ASSE currently developing canvas standard

- ANSI Z690.1 Guidelines for Mold and Fungi Control and Remediation for Worker Protection in Indoor Work Environments

OSHA Issues Guidance for Protecting Against Avian Flu

- More information is available online at: http://www.osha.gov/OshDoc/data_AvianFlu/avian_flu_guidance_english.pdf

CDC's Interim Pandemic Flu Guidance Suggests 'Social Distancing' in the Workplace

- More information is available online at: <http://www.osha.gov/Publications/OSHA3327pandemic.pdf>

House Science Committee Approves Legislation that would establish voluntary guidelines for cleanup of former methamphetamine laboratories

- H.R. 365 The Methamphetamine Remediation Research Act

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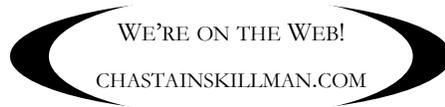
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