IECA
Great Rivers chapter
INTERNATIONAL EROSION CONTROL ASSOCIATION

A Newsletter For Members and Friends of the Great Rivers Chapter of the International Erosion Control Association

Fall 2010 **Great Rivers IECA**

Inside this issue:

President's Message: Are We There Yet?

Last weekend on a road trip with two of my children, I chuckled when we were no more than 30 minutes from home, and I heard the first *"are we there yet?"* come from the back seat. Now these two kids are pretty young (ages 4 and 5), but I thought I had made it pretty clear that this was going to be a six hour trip (three hours each way) and that it was completely voluntary. They didn't have to go with me. Although I knew they would ask, I was hoping they might be old enough to grasp how long the trip would be, but apparently I was wrong.

Leading up to, and since, that trip I have had several conversations with professionals in the Stormwater/Erosion Control industry and all the sudden the CFL light bulb flickered to life above my head with an unmistakable 4-word synopsis of the majority of those conversations - *"are we there yet?"* I know that in comparison to many of the people that I meet and work with on a day-to-day basis, my 10 years of experience isn't terribly significant, however in my experience I have noticed that this has become a recurring question or theme.

So…are we there yet?

The answer to the question will vary widely depending on the role you play. For example, if you are a regulator have you met your compliance obligations both to the regulators above you (yes the regulators are regulated as well) and to those whom you regulate? If you're an applicant have you met all the compliance obligations for the permits on your sites? You can imagine how many different answers you would come up with if you asked a diverse room of Stormwater Professionals the same questions.

Personally, I would say no. Not because as a stormwater inspector I haven't been focused on achieving compliance on all the sites that I work on, but because I think the goal is a moving target. There are so many variables when it comes to permit requirements, from jurisdiction to jurisdiction, gray areas in permit documents, focus and intent of whatever the current regulation enforcement efforts may be - I would find it pretty difficult to say that I have made it to the ever elusive nirvana of 100% permit compliance on all sites all the time…or is that even the goal? That's another topic for another newsletter.

So if you have achieved stormwater nirvana or if you're still chasing the brass ring like the rest of us, I would strongly urge you to get registered for this year's Fall Conference (how's that for a segue). If you haven't done so yet check out the website by clicking on the link www.iecafallconference.com and get your registration sent in for this unbelievable educational and networking opportunity. At the risk of sounding like a broken record, our tremendous partnership with the City of Omaha for this year's show has given us the opportunity to orchestrate one of the biggest conferences we have ever done! We are really excited to be able to offer such a diverse range of topics with amazing presenters at such a beautiful venue for such an incredibly low price. I hope to see all of you there.

Thank you for the opportunity to serve,

Thomas M. Wells, CPESC, CISEC
IECA Great Rivers Chapter President

Meet Your Board Member — Brock Peters, CISEC

Brock Peters, CISEC, is an erosion and sediment control contractor and consultant with over thirty years of progressive accomplishments in the construction industry. As a current Board Member of IECA, Brock is Technical Vice President and Board Liaison to the Professional Development Committee and is currently serving a second term on the Board of the IECA Great Rivers Chapter.

He is serving his fourth term on the Board of Directors of the Home Builders Association of Lincoln and a fourth term on the Board of Directors of the Nebraska State Homebuilders Association. He has been appointed several times by the National Association of Homebuilders to serve on the Environmental Issues Committee and is currently serving another term.

As a founding member of the Storm Water Awareness Network (SWAN), Brock is the Project Coordinator and creates curriculum for providing educational training for NPDES compliance to developers, builders, and trade contractors for the commercial and residential building industry.

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Storm Water Awareness Network (SWAN)

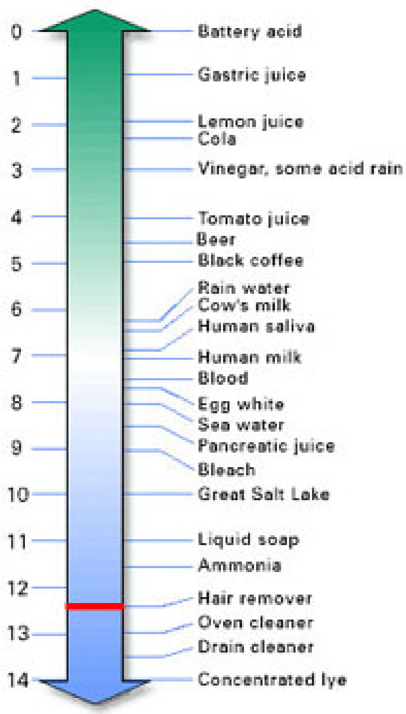
Brock Peters, a Board Member for the Great Rivers Chapter and the International Erosion Control Association

The Sediments Stops Here

Concrete Washout Pits

By Dean Mattoon

In my duties of reviewing storm water pollution prevention plans for the City of Dubuque, as well as inspecting the construction sites themselves, one of the things I have continually seen left out is the concrete washout area. This elusive best management practice (BMP) is one of the most important pieces of the job site, especially where there are illicit discharge ordinances in place. The main goal, obviously, of the concrete washout pit is twofold: to trap the slurry from the chute that needs to be washed before the concrete trucks can pack up and leave; and also to discard any unused concrete in the barrel if the truck does not want to haul it back and dispose of it at the concrete plant.



According to an article from Concrete Washwater Systems Inc: "Concrete (mortar, grout, plaster, stucco, cement, slurry) washout wastewater is caustic and considered to be corrosive with a pH over 12, essentially the same as Liquid Drano®, Ammonia or other household cleaning detergents. pH is a measure of how acidic or alkaline a substance is. The pH scale goes from 0 to 14, where 7 is neutral. A low pH value means the sample is acidic, while a high pH value means that the sample is basic or alkaline. A change in one pH unit means a tenfold change in concentration, similar to the Richter scale and measuring earthquakes." High pH within our fresh water streams increases the toxicity of other substances and may lead to fish kills.

Despite its important nature, this BMP can be extremely primitive and still perform its function effectively while not breaking the bank. I have seen washout pits that range from glorified holes in the ground to well constructed 3rd party manufactured devices. I have even heard of contractors using plastic "kiddie pools", which sounds downright childish but apparently works quite well and are reusable due to their pliable nature and smooth surfaces.

One of the great things about this technology driven age, is that new BMP's are coming onto the market all the time that are effective and reliable. These new products range from one time, disposable bags that range from 30 to 300 gallon capacities, to large reusable, metal containers that can be moved from jobsite to jobsite. These new products have proven to be more durable than the traditional plastic sheeting used in the past.

Whatever method of capturing concrete washwater is used, it is important to make sure something is available on site for the proper disposal of these materials and that the BMP is maintained regularly for peak performance and the safety of our waterways.

Researcher's Corner

Road Salt: Understanding the Impact, Addressing the Issue

By Rebecca Knauten

With cooler weather in the foreground, Midwestern contractors and government agencies may be preparing for winter road maintenance. The road salt issue has seen a recent reprise in the stormwater industry. However, what may appear to be a "new" conversation to some is in fact a common topic for years in the scientific research world. What's new is the policy and administrative decisions that may influence how road salt is applied and managed. For IECA members, this could have a profound, direct impact on regular job duties. For that reason, this article is meant to offer a basic primer on road salt from a water quality perspective; and also share insight on ways of addressing the issue.

The Science of Salt

Years of data collected throughout North America indicates road salt on paved, impervious surfaces has a profound impact on surface water quality. Road salt contamination of surface and groundwater is generally localized around roadways and is directly proportional to the mass of applied road salt (Foos 2003). In other words, the more salt we put on our roads, the greater the potential for groundwater and surface water contamination. While road salt does offer safety for winter driving, the long-term effects are just now being considered.

Salts in freshwater habitat have serious and detrimental impacts on aquatic life. An estimated 10% of aquatic species exceed their critical tolerance values for chloride with prolonged exposure to concentrations above 220 mg/l, but many macroinvertebrates exhibit lower tolerances. The current Iowa water quality standard for chloride is 250 mg/l for drinking water use. In 2009 the State of Iowa also adopted criteria for surface water, which includes a hardness factor and calculation to identify any exceedances. However, a site-specific total dissolved solids (TDS) approach, identifies acute toxicity threshold for chloride concentrations at 860 mg/l, and a chronic threshold of 230 mg/l. These values are equal to EPA's 1988 304(a) national criteria values. At these concentrations, it is assumed that aquatic life are severely stressed by chloride concentrations.

Urban areas are not solely subject to road salt impacts. At the same time, we've ramped up our road salt use over the second half of the last century. SUNY researchers Godwin, Hafter and Buff studied the chloride levels in the Mohawk River, a predominantly rural watershed in northern New York State. Receiving a high volume of snow, this area also had a high level of road salt application. Being rural, the researchers assumed the primary chloride source as the road salt applications. The researchers found the mean, minimum, and maximum concentrations of both sodium and chloride in the Mohawk River, from the 1990s were all greater than their counterparts from both the 1950s and 1970s, with a 95 percent confidence index. In comparison to other ion measurements over time, the magnitude of the change in salt concentrations was much greater than that of any other changes during this time period. Compared to 1970s estimates, all ion yields from the 1990s showed a decrease in mean daily yield, except salt ions, which showed an increase of 34 and 40%, for sodium and chloride, respectively. The results of this study suggest that the ionic composition of river water did significantly change over the latter part of the 20th Century, with mean chloride concentrations increasing by more than two-fold from the 1950s.

The Mohawk River basin study identified alarming groundwater concentrations, with chloride concentrations found in wells and springs of six of the 14 contributing counties range from 0.2 to 10, 800 mg/l, with a mean value of 62.12 mg/l (n=288). Considering the EPA acute and chronic toxicity thresholds, the area is experiencing proportionally high chloride concentrations in groundwater. This same report recommends persons on low sodium diets avoid drinking groundwater in this watershed during such periods of high chloride detection.

Care for a little cyanide with your salt?

Salt may only be one reason for concern as we de-ice our roads. Besides sodium and chloride, road salts may have smaller amounts of calcium, potassium, and magnesium chlorides. Also, in the 1950s, iron cyanide compounds (ferrocyanide) were added to salt as an anti-caking agent (Paschka, etc.al. 1999). In water, sodium ferrocyanide can release approximately 25 percent cyanide ions. In 2003, the USEPA listed ferrocyanide as a toxic pollutant and hazardous substance under Section 307(a) of the Clean Water Act. According to the Pasckha literature review, study of possible water quality side effects of iron cyanide additives in road salt has been limited to date. No thorough field monitoring study has been conducted to investigate cyanide levels in surface and groundwater as a result of the application of deicing salt. A basic experiment conducted by the Morton Salt Company showed that iron cyanide compounds present in snow melt and runoff can decompose to release free cyanide, and approximately 25 percent of cyanide present in complexed forms can release as free cyanide. (Fiedelman and Kuhajek, 1975). The study found that dissociation of iron cyanide occurred faster in shallow waters exposed to sunlight than in deeper waters. As a result, smaller, shallow urban streams may be more susceptible to the release of free cyanide from road salt accumulation on un-swept city streets.

High chloride concentrations in small, urban streams may also indicate the potential for the existence of certain bacteria populations. However, this question warrants further exploration. According to Dickman and Gochnauer the addition of 1000 parts per million sodium chloride to a small stream in order to simulate road salt loading resulted in a reduction in algal density and an increase in bacterial density on artificial substrates left in the stream over a four-week period. The study found reduced algal diversity at the salt stressed station (1:88 compared with 2:49 in week 3 and 2:61 compared with 2:91 at the end of the fourth week) while phytophagous grazers were far more abundant at the salt-free control station.. In short, research may indicate a positive relationship between chloride and certain bacteria monocultures in urban streams. Due to the questions posed in existing literature and research on chloride in urban watersheds, it may be worth considering further research on impacts of road salt on small, urban streams; the relationship between high chloride content, algae and bacteria growth, and the accumulation of salts, metals and other constituents in both urban stream bed and stormwater retention pond sediments as a way to track long-term impacts on surface water quality. However, regardless of current and future research needs, ample data exists today to confirm we need to take a serious look at our salt use on transportation surfaces.

Saline "*Solutions?*"

Because of the heightened awareness of salt contamination in freshwater ecosystems, Transportation agencies are often being asked to use "environmentally friendly" or less toxic alternatives wherever possible, but there is no commonly accepted guidance for determining which products meet these criteria. One source for guidance on mitigating environmental impacts of road salt is a 2007 report by the National Cooperative Highway Research Partnership (NCHRP): "Guidelines for the Selection of Snow and Ice Control Materials to Mitigate Environmental Impacts." The full report is available online at: http://onlinepubs.trb.org/onlinepubs/nchrp/nchrp_rpt_577.pdf

The overall objective of the NCHRP project was to develop guidelines for selecting snow and ice control materials based on their properties and common site-specific conditions near roadways on which these products would be used.

There are two major components to this report: a summary and review of technical information on the performance and environmental impacts of available materials, and results of an analytical laboratory testing program designed to address gaps in the current literature and characterization of 42 chemicals. The second component also includes a decision tool for the selection of materials, purchase specification, and a quality assurance monitoring program.

Cold weather climates are not alone in the chloride battle. Salt and nutrient management plans are a new state requirement for all groundwater basins throughout California (Matsumoto, 2010). An arid region, chloride contamination is often due to surface salt accumulation from irrigation systems in agricultural areas. However, with shallow aquifers and near-immediate surface transport of the salt to groundwater, chloride is a major concern in these areas. Such plans are required as part of the Recycled Water Policy issued by the California State Water Resources Control Board (SWRCB) and took effect May 14, 2009. The policy notes that some basins contain salts and nutrients that exceed or threaten to exceed water quality objectives established in their Water Quality Control Plans (a.k.a., Basin Plans) issued by their Regional Water Quality Control Board (RWQCB).

In the Midwest, Wisconsin is taking the most aggressive approach to the road salt/chloride issue. Because of the large lakes in the metro area, the City of Madison has been addressing the deicing salt issue for nearly 40 years, starting with the Lake Wingra watershed project in 1972–73, with the rest of the city following suit by 1977–78. Despite this early effort, concentrations have nearly doubled in recent decades. In the winter of 2004–05, 48% more road salt was applied to Madison's 750 street miles compared with 1972–1973, adjusting for the difference in street miles maintained.

According to Roger Bannerman with Wisconsin Department of Natural Resources, the natural cycles of lakes may be disturbed due to chloride concentrations. "Lakes tend to turn over and the water becomes homogenous and the temperature becomes even, but chloride creates a density gradient where it won't turn over anymore. And of course, if the chloride concentration gets high enough, things living in it can't tolerate that high level."

Bannerman acknowledges other options besides salt are being considered, which may bring alternative consequences of their own. "Things like beet juice and other things are being tried. One thing we're worried about is that any organic-based deicer might have high phosphorus content—that's the last thing we can have."

No "Shakin'" the Salt

Today's stormwater BMPs cannot remove chloride from surface water. As a result, the only way to reduce the salt impact is to reduce the overall salt load. The 2006 Madison Policy Salt Use Subcommittee to the Commission on the Environment (COE) outlined several equipment modifications and technologies and made recommendations regarding their use. The COE contends that these measures, taken together, could reduce the amount of salt applied in the city by 20% to 30%. Accordingly, all applicators should be able to reduce their amounts applied by 20% to 30%.

While no regulations were set, the City of Madison did adopt several recommendations in a deicing salt-use ordinance, including the use of anti-icing or pre-wetted salt in advance of storms to reduce the volume of salt needed during winter weather. More training for drivers has been offered, and the City is working with county municipalities to systematically reduce the amount of salt used each year. Ultimately, the committee is requesting that the Dane County Lakes and Watersheds Commission survey other area governmental agencies, municipalities, and private salt applicators to determine their road salt policies; establish benchmarks for chloride content in lake water; and recommend policies to all governmental agencies, municipalities, and private salt applicators to achieve benchmarks by a commission-established date.

Communities looking to comprehensive salt use plans, policy and water quality monitoring serve as good examples and resources for others interested in addressing the road salt issue. Transportation safety will require clear roads, and economics identifies salts as the best option. But good training knowledge of water quality impacts may help reduce the rate at which we introduce salts to groundwater, our lakes and streams. Because once it is in the system, there is no taking it back out.

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New Five-year USGS Study Evaluates Native Species vs. Turf; Clay vs. Sand in Rain Gardens

By William R. Selbig and Nicholas Balster

A recently-released study by the U.S. Geological Survey, in cooperation with a consortium of 19 cities, towns, and villages in Dane County, Wis., compares the capability of rain gardens with different vegetative species and soil types to infiltrate stormwater runoff from the roof of an adjacent structure. Two rain gardens, one planted with turf grass and the other with native prairie species, were constructed side-by-side in 2003 at two locations with different dominant soil types, either sand or clay. Each rain garden was sized to an approximate 5:1ratio, and a six inch depth.

Both rain gardens in sand, as well as the prairie rain garden in clay, retained and infiltrated 100 percent of all precipitation and snowmelt events during water years 2004–07. The turf rain garden in clay occasionally had runoff exceed its confining boundaries, but was still able to retain 96 percent of all precipitation and snowmelt events during the same time period. In general, infiltration rates were greater during spring (April and May) and summer (June through August) months.

Predictive modeling was also analyzed as part of this study. Five of the six observed storage capacity exceedences between April–November 2004–07 were predicted by use of a combination of the normalized surface storage volume, the median infiltration rate, and an estimate of specific yield for soils under the rain garden to a depth equal to the uppermost limiting layer. By use of the same criteria, in water year 2008, when the contributing drainage area to the clay prairie rain garden was doubled, all four observed storage exceedences were predicted. The accuracy of the predictions indicates that by applying measurements of the appropriate soil properties to rain garden design, environmental managers and engineers may improve the tailoring of design specifications of rain gardens for new or retrofitted areas.

An examination of soil structure and the root systems in the rain gardens in clay revealed striking differences between turf and prairie vegetation. Soils under the prairie rain garden, although they possessed the remnants of a limiting clay layer, appeared well-drained, whereas those under the turf rain garden showed marked evidence of a perched water table. Although roots were present in all horizons sampled within clay soil in the prairie rain garden, roots were limited to the upper A and Bt horizons within the turf rain garden. Collectively, these differences indicate higher soil quality in the prairie rain garden in clay relative to the rain garden planted with turf grass.

This study was conducted by a consortium of 19 cities, towns, and villages in Dane County, Wisconsin. Complete text of the final report is available at: http://pubs.usgs.gov/sir/2010/5077/.

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