EMERGENCY MANAGEMENT ISSUE

In this issue:

HOUSTON PUBLIC WORKS
The Life of Hurricane Harvey in the Eyes of Public Works
See page 33
APWA’s Awards Program recognizes individuals, groups and chapters for their outstanding contributions to the profession of public works. Some of the awards presented include Professional Manager of the Year Awards, Myron Calkins Young Leader of the Year, Public Works Project of the Year, and Top Ten Public Works Leader of the Year, to name just a few.

Each award is listed on the APWA website. Criteria and nomination forms for the 2018 Awards Program are now available online.

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INSIDE APWA

2 President’s Message
4 Technical Committee News
6 How a Strategic Asset Management Plan focused our efforts within a small town
9 City of Santa Monica’s Public Works Department receives APWA accreditation
11 For Transportation Girls everywhere, we can do better than eight percent
13 In & Around APWA
14 Index to 2017 articles

COLUMNS

20 Washington Insight
22 GAC Insight
23 Imagination to Innovation
24 Open Your Winter Toolbox
26 Public Asset Management
29 Leading from the Frontlines
30 International Idea Exchange

FEATURES

33 Houston Public Works: the life of Hurricane Harvey in the eyes of public works
36 Preparation and response to Hurricane Irma: the Florida experience
40 Emergency repairs on the edge of a continent: keeping California’s Highway 1 open along the Big Sur coastline
43 Free TEEX training for public works staff
46 Suspicious Activity Reporting: The role of public works
50 Fusion Liaison Officer Programs: Effective sharing of information to prevent crime and terrorism
52 Connecting the Dots: A local perspective on coordinating with a fusion center
53 National Weather Service Radar: Radar 101
57 GOES-R: What’s new in orbit
60 Mutually Beneficial: Public Works & the Weather-Ready Nation Strategic Initiative

MARKETPLACE

65 Products in the News
66 Professional Directory

CALENDARS

64 Education Calendar
68 World of Public Works Calendar
68 Index of Advertisers

On the cover: original art by Jill Thompson, APWA
First responders are not only prepared for natural disasters, but also for human-caused disasters in the west and the natural and human-caused disasters in between. In 2017, many of our communities and our public works counterparts were personally impacted by the disasters. In watching the coverage of the communities responding to and recovering from their events, I took great pride in the active role that the public works professionals have in that effort, including many of our 30,000 members. It is that passion for public service, which I got hooked on in high school, that makes our profession so strong.

Public works professionals are responsible for planning, mitigating, responding, and recovering from disasters and emergencies in the communities they serve, and this was once again made apparent in 2017. To put it bluntly, public works professionals make normal happen for their communities, but our ability to do this is heavily influenced by trust with our first responder counterparts and our own level of preparedness.

It is important to recognize that for a long time there has been the feeling within the public works community that we are not seen in the first responder role by others. There is no doubt that everyone within the first responder community has room to improve regarding communication and coordination with others. The basis for any real improvement in communication and coordination, especially between public works and other first responders, will fundamentally come down to trust.

To build trust within the first responder community, we must proactively reach out to our first responder colleagues and ask how we can assist and what can we do. The responsibility for communication is jointly shared. If we have the skills and equipment to respond to an event, it is our responsibility to reach out to the right people to ask how we can be of assistance. Remember, the people involved in the incident are focused on dealing with the situation at hand to the best of their abilities with the tools they have. They have a lot going on and trying to figure out what others may have and how to get in touch with the resources may not be feasible considering the conditions. Now, just because we offer assistance does not mean that we have to be accepted. And, if we are not used, we should not take it personally nor should it stop us from offering assistance in the future. The first responder community is about relationships, relationships which take time to develop and a commitment to maintain. Improving communication and coordination with others.

From the hurricanes in the southeast to the fires in the west, and the natural and human-caused disasters in between, 2017 was quite the year. Our hearts go out to those communities and our public works counterparts who were personally impacted by the disasters. In watching the coverage of the communities responding to and recovering from their events, I took great pride in the active role that the public works professionals had in that effort, including many of our 30,000 members. It is that passion for public service, which I got hooked on in high school, that makes our profession so strong.

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working relationships with other first responders is good, will benefit everyone, and it is worth the effort.

Trust must be built at all levels. In most communities it will be the front-line staff or immediate supervisors making the initial decisions after an emergency occurs. Police or fire supervisors need to know and feel comfortable calling the appropriate public works supervisor at any hour of the day or night when the emergency occurs. Sometimes people feel guilty about making that call, but when the personal relationship is built beforehand, the police or fire staff will not have any hesitation in making the call.

In order for public works professionals to be able to respond when needed, it is essential that we also prepare ourselves and our loved ones for an emergency. Being prepared can seem a bit overwhelming at first, but the consequences of not being prepared are much worse. While preparing for an emergency may look a bit different depending on where you live, at the most basic level everyone should have a plan for how they will receive emergency alerts, alternate shelter in place, how and where to evacuate, and how they would communicate with family/friends. Several resources are available to help with this process:

**Resources**

- **Do One Thing:** Small steps toward being prepared for an emergency - [http://do1thing.com/](http://do1thing.com/)
- **Plan Ahead for Disasters** – [https://www.ready.gov/](https://www.ready.gov/)

The January 2018 edition of the *Reporter* has many great topics on a wide variety of emergency management-related topics. APWA’s Emergency Management Committee has been actively working to strengthen collaboration between APWA and the National Weather Service, American Meteorological Society, and the National Fusion Center Association. Some of these collaborations have led to articles within this issue, but more importantly, the collaborations have reinforced the essential connection between public works and other professions such as weather/climate and national security. I would encourage you to not only spend some time learning about these resources and applying them in your place of work, but also preparing yourself and your family for an emergency. Remember that it is never too early to prepare, but it can be too late.
public works professionals are truly the last to leave an emergency. “We live in a world of constant change with domestic terrorism and extreme weather events becoming a daily norm for the world,” says Phil Mann, Chair of the Emergency Management Committee. “As public works professionals and first responders, it is critical that we plan for events and be prepared to respond and work with other first responders to address an evolving and changing world.” The Emergency Management Committee is developing resources so that you and your agency can better prepare for emergencies where you will be the last to leave. If you haven’t already read President Mills’ message at the beginning of this issue, I encourage you to do so. A great quote from the article is, “Remember that it is never too early to prepare, but it can be too late.”

In this issue of the Reporter you will find the following articles:

- Houston Public Works: the life of Hurricane Harvey in the eyes of public works
- Preparation and response to Hurricane Irma: the Florida experience
- Free TEEX training for public works staff
- Suspicious Activity Reporting: The role of public works
- Fusion Liaison Officer Programs: Effective sharing of information to prevent crime and terrorism
- Connecting the Dots: A local perspective on coordinating with a fusion center

As public works departments are impacted by weather from hurricanes to tornados to extreme rain events and droughts, there are several articles on weather and public works that you should read in this issue:

- Mutually Beneficial: Public Works & the Weather-Ready Nation Strategic Initiative
- GOES-R: What’s new in orbit
- National Weather Service Radar: Radar 101

The Emergency Management Committee and its subcommittees provide education and information through sessions at PWX; Click, Listen & Learn programs; postings on the Emergency Management InfoNOW Community on APWA Connect; and articles in the January edition of the Reporter.

If you have considered participating in APWA on a national level, you may be interested in serving on one of the five Emergency Management subcommittees. Most subcommittee meetings are held monthly by conference call. The subcommittees are:
• Canadian Subcommittee – this subcommittee will continue their efforts to identify and discuss the unique needs of our Canadian members.

• Chapter Advocacy Subcommittee – assists chapters in cultivating emergency management champions and educating members on their role as first responders.

• Education & Training Subcommittee – identifies or develops training materials.

• Resources Subcommittee – identifies materials available to public works professionals and assists in disseminating, e.g., hazard mitigation plans and technology and software which assist in preparing for reimbursement requests.

• Special interest/Hot Topics Subcommittee – e.g., cyber security, pandemic, UAVs, flooding.

APWA members interested in serving on one of these subcommittees should contact staff liaison Rita Cassida at rcassida@apwa.net.

The current members of the Emergency Management Committee are:

• Mr. Phil Mann, P.E. (Committee Chair), Public Works Director, City of Gainesville, Florida

• Mr. Leon Berrett, P.E., Operations Associate Director, Salt Lake County Public Works, Utah

• Mr. William F. Carson, P.E., Public Works Operations Manager, Charleston County, South Carolina

• Mr. Peter Drenan, FEMA Project Director, Fluor, Arlington, Virginia

• Ms. Loni Eazell, Sr. Disaster Services Analyst, Department of Public Works, Los Angeles County, California

• Mr. Kevin Gentry, Streets & Drainage Superintendent, Athens-Clarke County, Georgia

• Mr. Mark Ray, P.E., Director of Public Works/City Engineer, City of Crystal, Minnesota

• Mr. Steve Materkowski, EIT, Senior Construction Manager, Urban Drainage & Flood Control District, Denver, Colorado

Stan Brown, P.E., PWLF, City Manager, City of Oakwood, Georgia, serves as the committee’s liaison to the APWA Board of Directors through his role as Director-at-Large.

Rita Cassida, P.E., serves as the liaison to four of APWA’s Technical Committees: Emergency Management, Engineering & Technology, Utilities & Public Rights-of-Way, and Water Resources Management. She can be reached at (816) 595-5222 or rcassida@apwa.net.

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#APWAAccreditation
If your small community is finding it challenging to ensure you maximize the value your stakeholders receive from your existing infrastructure, with or without experiencing growth, you can relate to the opportunities—and slight pain—that we’re experiencing in Castle Rock.

Colorado is welcoming, on average, close to 100,000 new residents every year. As a family-friendly bedroom community on the southern edge of the Denver Metro area, Castle Rock is becoming home to many of the state’s new residents. That, of course, means new demands on our transportation infrastructure assets. Often, it feels like we’re just trying to keep pace while dealing with the mood swings. While I’m being a bit tongue-in-cheek, we know the pressure of a growing community creates a variety of real stresses on Department staff. Here’s how we’re bringing some focus and efficiencies to how we manage some of the Town’s largest assets.

As an APWA accredited agency, we know policy and procedural documents are the primary rudder for navigating choppy seas. Using these documents to guide real-time, everyday decisions helps keep staff grounded and focused. Now, we are using this philosophy to improve our Asset Management System.

To assist readers with making sure we’re on the same page, we’ll start with a quick definition. Our Asset Management System is the formal activities we utilize to manage our physical transportation infrastructure assets. It includes not only our computer databases and work order management software, but also our policies and procedures associated with managing these assets to name just a few.

**Brief History: Castle Rock’s First Strategic Asset Management Plan**

The Town’s Public Works Department just recently developed our first Strategic Asset Management Plan, which is the foundational guiding document that focuses our efforts in this area. It contains the prevailing policy principles and objectives that apply to all of our infrastructure assets, along with an action plan to chart our course toward improved system efficiencies.

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**Dan Sailer, P.E.**
Assistant Public Works Director
Town of Castle Rock, Colorado
APWA Small Cities/Rural Communities Committee Chair & APWA Asset Management Task Force Member

**Strategic Asset Management Plan cover**

Prior to the development of this plan, the Department was doing a good job of quantifying our levels of service.
in some key areas such as pavement maintenance, snow management, traffic signal operations, and a few others, but we were lacking this strategic approach in other areas. Additionally, prevailing management philosophies were being applied to different asset classes. For example, our Fleet Division has been doing a great job of managing our vehicle and equipment assets to achieve the lowest total life-cycle costs, but we were not necessarily applying this same approach to all of our assets.

So we began there.

**Plans to action: Start with staff**
First, we wanted to ensure that our various staff with responsibilities for different asset management activities were operating under the same principles and objectives. We also wanted to ensure that these management principles and objectives were in tune with the Town’s senior executive (Town Manager), and maximized the primary value our transportation stakeholders desire from these assets. After all, maximizing the “value” from an asset is what asset management is all about.

**Plans to action: Classify your assets**
With everyone on the same page, we categorized our transportation infrastructure into eight different asset “classes” (see graphic above):

From here, we assessed the value that we’re striving to maximize from these assets. The following are just a few illustrative examples:

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City regulators have acknowledged that having a CSM as part of a local government gives a more comprehensive approach with better understanding of what is required by the State/EPA regulators.

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- Reliability
- Low downtime
- High safety value
- Low environmental impacts

By understanding the value that we’re striving to maximize from our infrastructure, our vision was coming into focus, and we could develop our guiding principles and objectives that are common to each asset class.

**Plans to action: A policy example**

To give you a feel for what this looks like, I’m providing just one principle and associated objectives here:

**Policy Principle:** Management of physical assets shall be conducted in a sustainable manner.

- **Objective #1:** Funding levels necessary to maintain established asset life cycles should be conducted annually as part of the budget process.
- **Objective #2:** Environmental goals should be established for all physical asset classes.

What these two elements do is provide clear direction to the Department regarding management expectations.

Out of this, the Department staff is able to take this direction and build detailed standard operating procedures that are unique to each asset class. We are currently developing individual Asset Management Plans for each asset class that does just this.

**Plans to action: Implementation**

A plan is only as good as our team’s ability to implement it daily. That’s why the Strategic Asset Management Plan has an action plan that establishes targets to implement the vision. See our example below left.

**Plans to action: Bring your staff with you**

Getting the full Department staff input on the development of this plan was a critical component. It allowed for a variety of perspectives to be included, and it also assisted with buy-in from those that will be the driving implementation force. We completed this by first ensuring that the vision was understood and feedback received. This involved a few different meetings with key staff. From there, document reviews were conducted by these same key staff members.

From start to finish the total effort took approximately six months.

While the adoption of this plan is new to the Department this year, it is really assisting with focusing Department staff’s efforts in the area of asset management. In the long run, we are expecting this to save the Town money by most efficiently utilizing the financial resources dedicated to asset management. In addition, we expect to save time by creating documented instructions, which will assist with continued continuity as employees enter and leave the Town. It may even reduce mood swings.

Dan Sailer can be reached at dsailer@crgov.com.

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**ACTION PLAN**

The following tables outline the time-based targets for implementation of this SAMP.

<table>
<thead>
<tr>
<th>INVENTORY: Complete remaining inventory of assets for all identified asset classes.</th>
</tr>
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<tbody>
<tr>
<td>Lead Division(s): Streets, Engineering, Fleet, Traffic &amp; Transportation Planning</td>
</tr>
<tr>
<td>Support Division: Administration (GIS)</td>
</tr>
<tr>
<td>Activities</td>
</tr>
<tr>
<td>All aspects of asset classes inventoried</td>
</tr>
<tr>
<td>Any existing asset attributes that are not necessary for analysis or regulatory reporting are eliminated from asset management software</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>REMAINING LIFESPAN: Establish remaining lifespan attributes for all assets.</th>
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<tbody>
<tr>
<td>Lead Division(s): Streets, Engineering, Fleet, Traffic &amp; Transportation Planning</td>
</tr>
<tr>
<td>Support Division: Administration (GIS)</td>
</tr>
<tr>
<td>Activities</td>
</tr>
<tr>
<td>Create ‘remaining lifespan’ attribute within Department’s asset management software and populate field for each asset</td>
</tr>
</tbody>
</table>

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<tr>
<th>G.3.5.3. 34: Confirm asset attributes conform to G.3.5.34 reporting requirements.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lead Division(s): Administration (GIS)</td>
</tr>
<tr>
<td>Support Division(s): Finance Department (Accounting)</td>
</tr>
<tr>
<td>Activities</td>
</tr>
<tr>
<td>Obtain required reporting attribute information from Finance Department</td>
</tr>
<tr>
<td>Create any needed attributes within Department’s asset management software and populate fields for each asset</td>
</tr>
</tbody>
</table>
The City of Santa Monica has achieved the prestigious APWA accreditation that serves as the nationwide gold standard in the public works industry. Per Public Works Director Susan Cline: “I am proud that Santa Monica has achieved the APWA accreditation. This was a longstanding goal of Public Works and everyone’s hard work getting us across the finish line was exemplary.”

The purpose of the accreditation program is “to provide means to formally verifying and recognizing public works agencies for compliance with the recommended practices set forth in the Public Works Management Practices Manual.” The accreditation is a valuable tool for determining if an agency’s policies and procedures meet and/or exceed national practices in the field of public works.
The City of Santa Monica started the accreditation process back in 2010 but did not actively pursue it until staff started the process again in January 2016. At that point, the City of Santa Monica’s Accreditation Manager assigned each of the 10 divisions within the Public Works Department practices that pertained to the divisions operations. Staff met every other month to provide a status update and to discuss areas that required cross-divisional input.

Once staff completed the self-assessment, an onsite visit was scheduled for April 17-19, 2017. The visit was led by a four-person evaluation team, consisting of the Accreditation Manager for APWA, Tracy Quintana, and three public works officials from other accredited agencies. The site visit was kicked off with a breakfast at the Annenberg Beach House and an introduction to the City of Santa Monica’s Public Works Department by the Director of Public Works, Susan Cline. In addition, each of the Public Works divisions had an opportunity to give a brief division overview. After the breakfast, City staff took the accreditation team on site visits to the California Incline, the Santa Monica Urban Runoff Recycling Facility (SMURRF), followed by a tour of the City yards.

After the site visits, the evaluation team reviewed 486 practices over a two-day period with City staff and found 479 of the Santa Monica Public Works Department’s practices in full compliance and seven in substantial compliance with nationally recognized standards. In addition, the reviewers deemed four practices as “model” practices for other agencies to follow.

Upon completion of the site visit, the evaluation team forwarded the results of the site visit to the Accreditation Council. On May 8, 2017, the City of Santa Monica was informed that the APWA Accreditation Council awarded full accreditation to the agency for the ensuing four-year period. The City of Santa Monica became one of 18 agencies in California and the 122nd agency to gain accreditation out of more than 15,000 public works agencies throughout North America.

Sybille Moen can be reached at (310) 458-2201 or sybille.moen@smgov.net.

“I am proud that Santa Monica has achieved the APWA accreditation. This was a longstanding goal of Public Works and everyone’s hard work getting us across the finish line was exemplary.”
Earlier this year, I was very fortunate to attend an event with an incredible inspirational speaker and author named Nicole Nageli. I almost found it hard to believe, but she is the founder and CEO of N3 Cartoons, a TEDx speaker, and the award-winning author of multiple books. The hard-to-believe part of the story is that Nicole is only 14 years old. She published two award-winning books when she was just 12 years old. I don’t know about you, but when I was 12 years old I was just trying survive the halls of junior high school and probably couldn’t tell you what the acronym CEO meant.

The event I attended was called Transportation Girl hosted by the U.S. Department of Transportation and, as the final (and youngest) speaker, Nicole mesmerized the room.

For Transportation Girls everywhere, we can do better than eight percent.
Women make up about eight percent of people working in the construction industry and less than ten percent of people working as civil engineers, according to the Bureau of Labor Statistics for 2014 and 2016, respectively. This is something the U.S. Department of Transportation is determined to change. USDOT has previously offered internships for college-age women “but we found we were too late, we need to focus on high school and younger” according to Keller Hayes, the DOT’s small business representative in Denver. One strategy to reach this younger audience is the DOT’s Career Days Discovery Program which recently culminated in the inaugural Transportation Girl event.

The Career Days Discovery Program was originally supported by former USDOT Secretary Ray LaHood. It is designed to introduce girls and young women to jobs they may not traditionally consider, according to Hayes. Participants in this year’s program included middle school, high school and college students. They attended tours of Colorado’s Regional Transportation District (RTD) facilities, Denver International Airport and several women-owned businesses, paving companies, architecture firms and transportation firms.

Approximately 38 percent of RTD senior management are women, which is significantly higher than national averages. About 25 percent of people working in the national transportation sector are women. Many of the women who hold the most senior positions at RTD took the time to personally meet with the young Career Days Discovery Program participants and share their stories and encouragement. It is efforts like these by current industry leaders that can have significant positive influence on young people who are considering their career options.

The Transportation Girl event and the Career Days Discovery Program have come to fruition largely due to the tireless efforts of Keller Hayes. If you spend just a few minutes with her, you will quickly understand that encouraging young women is not only her passion but also her mission. I met Keller when the agency I work for, Adams County, offered to provide lead sponsorship of the Transportation Girl event. As the Director of Public Works, I was extremely excited to lend my support.

I would like to think that throughout my career I have been a strong advocate for encouraging women in the engineering and construction fields. I am proud to have appointed the first female Engineering Division Manager in Adams County history, I am lucky to have hired the best CIP engineering team (who just happen to be all female) and I am deeply honored to have been named Male Supporter of the Year for 2017 by the Society of Women Engineers Region. But I was truly overwhelmed by the level of sophistication and accomplishment shown by so many of the young attendees of the Transportation Girl event.

It is difficult to generalize the circumstances or positive influences that may have helped these young people achieve so much in such a short time. Is it more exposure to positive role models like the women leaders who offered their advice and support through this program? For motivational speaker (and 14 year old!) Nicole Nageli, is it the positive role models she has seen on a daily basis in her mother and father, both successful entrepreneurs in the Transportation and IT fields? It’s hard to know, but I’m convinced the Career Days Discovery Program, the Transportation Girl event, and the hard work of people like Keller Hayes and all the accomplished women who donated their time to these events will have a positive influence on the next generation of women leaders.

I used to think it was important that as leaders in the public works arena, we do everything we can to encourage a supportive work environment for talented women to succeed. I still believe that, but I now know we must also reach out to the younger generation, to Transportation Girls everywhere. We owe it to these future leaders and we owe it to the communities we serve. The public works field is overflowing with highly skilled, talented and incredible people—and we can certainly do better than eight percent representation for the highly skilled, talented and incredible women who want to enter this field.

Jeffery A. Maxwell can be reached at (720) 523-6817 or jmaxwell@adcogov.org.

“Prejudices, it is well known, are most difficult to eradicate from the heart whose soil has never been loosened or fertilized by education; they grow there, firm as weeds among rocks.”

– Charlotte Brontë (1816-1855), Author, Jane Eyre
Richmond, Va., sets sites on Vision Zero

In late October Richmond’s Department of Public Works joined the growing number of U.S. cities pledging support to Vision Zero. The global strategy asserts that traffic accidents with serious injuries and fatalities are preventable, not inevitable.

On October 27, Mayor Levar M. Stoney signed the official document designating Richmond as a Vision Zero city. That commitment puts Richmond in alignment with other cities striving to dramatically reduce and even eliminate traffic fatalities and severe injuries by 2030.

Several local agencies supporting the initiative attended the pledge signing, including AAA Mid-Atlantic, DRIVE SMART Virginia, Sportsbackers and SafeKids Virginia.

Vision Zero was first implemented in Sweden in the 1990s and has been successful in many European regions. In the U.S. there are 10 Vision Zero Focus Cities that adopted the initiative in 2016 and are helping to facilitate and accelerate getting the program into additional cities. Among the Focus Cities are Washington, D.C.; Los Angeles; Austin, Texas; and Boston. Nearly 30 cities nationwide are participating in Vision Zero.

Central Pennsylvania Chapter presents award to Congressman Costello

On November 22, the Central Pennsylvania Chapter presented Congressman Ryan Costello (R-PA) the “2017 Elected Official Award” at the South Lebanon Township Building in Lebanon County. In the photo from left to right: Robert Gates, Central Pennsylvania Chapter Director; Congressman Costello; Donna Jessup, Central Pennsylvania Chapter President; and Charlie Jones, Director of Region II.

Congressman Costello is the founding Chairman of the bipartisan Public Works and Infrastructure Caucus in the U.S. House of Representatives. He is serving his second term representing Pennsylvania’s Sixth Congressional District, which includes portions of Berks, Chester, Lebanon and Montgomery counties. While he was unable to attend the Central Pennsylvania Chapter Dinner on November 4, he provided remarks via video at https://housegop.box.com/s/26nejvw0x3h76o9zcdrakum0p12yg1a.
Listed in this index are all articles published in the 12 issues of the APWA Reporter during 2017. They are categorized by subject, with subject headings in alphabetical order. All of the articles can be found on the APWA Reporter web page at www.apwa.net/Resources/Reporter.

**Accreditation**
Fairfax County shares lessons learned from accreditation ascent, Jan., p. 13
Chattanooga Public Works receives APWA accreditation, Feb., p. 16
Success for the City of Gulfport, Mississippi, as they become the state’s first accredited agency, March, p. 14
A successful kickoff leads to accreditation for Shawnee, Kansas, May, p. 28

**Annual Buyer’s Guide**
Annual Buyer’s Guide, April, p. 66
Alphabetical listing, April, p. 66
Categorical listing, April, p. 82

**Awards**
Excellence in Snow and Ice Control Award, April, p. 10
2017 Top Ten Public Works Leaders named, May, p. 75
Could your agency be the next recipient of the APWA Excellence in Snow and Ice Control Award? July, p. 36
APWA announces the 2017 Public Works Projects of the Year, July, p. 48
Chapter Membership Achievement Award winners announced, Aug., p. 5
Awards 2017, Aug., p. 22

**Certification**
CPFP: It’s not about the title, it’s the experience and knowledge you gain, Jan., p. 11
CPII: Covering a vast array of public works expertise and knowledge, Feb., p. 19
CPFP: High-level achievements will be recognized, March, p. 16
CPII certification provides a gateway to network with your peers, July, p. 41
Payoff greater than sacrifice, Aug., p. 14
CPFP program helps fleet professionals increase their knowledge and expertise, Sept., p. 10
Certified Public Fleet Professional certification? Are you the best judge when determining what it can do for you? Oct., p. 8
CPFP Certification: Raising the bar on fleet performance, Nov., p. 6

**Council Corner**
Inspiring the next generation of civic leaders, July, p. 14
It Worked for Us, Aug., p. 10

**Diversity**
Kayla’s Krew, Feb., p. 21
Honoring cultural diversity through inclusion, March, p. 20
White Privilege? Where’s mine?!?, April, p. 31
Sustainable diversity, May, p. 29
Diversity: Changing a community, June, p. 8
NEAPWA’s Diversity Committee, July, p. 44
Diversity Matters: Now more than ever, Aug., p. 16
Diversity in the workplace, Sept., p. 12
Meet your APWA National Diversity Committee, Dec., p. 8

**Emergency Management**
The Southeast U.S. Public Works Response to Hurricane Matthew, Jan., p. 44
Incident Command System: A practical application, Jan., p. 47
Hennepin West Mesonet: Providing emergency managers with real-time environmental information, Jan., p. 49
Credibility through credentials, Jan., p. 51
The APWA Utah Chapter Emergency Management Mutual Aid Alliance, Jan., p. 53
Public works professionals have a duty to act, Jan., p. 57
Presidential Inaugural Planning and Response in the District of Columbia, Jan., p. 59

**Engineering and Technology**
Northbrook hits a home run with rainwater harvesting and flood mitigation, June, p. 24
The benefits of restoration in an urban environment: Amazon Creek in Eugene, Oregon, June, p. 28
Navigating PWX in a wheelchair, June, p. 33
Qualification-Based Selection: A recipe for a successful partnership, June, p. 36
What do you know? Public Works Organizations and Knowledge Management, June, p. 38
Close tolerance HDD is changing the open cut industry, June, p. 40
Advances in impervious surface mapping lead to fairer assessments, Aug., p. 118

**Facilities and Grounds**
The city that saved a river; the river that saved the downtown, April, p. 52
Choose the best athletic field surface to meet your needs, April, p. 56
Evolution: How to hit a facility curve ball when you are up to bat, April, p. 59
The value of interval meter data, April, p. 61
Here are the keys to the facilities, now what? April, p. 64

**Fleet Services**
Community Outreach: Communicating the value of fleet services in your community, Sept., p. 30
Key metrics for reliability-centered fleet maintenance, Sept., p. 34
The importance of training, Sept., p. 36
GFX celebrates public sector fleets, Sept., p. 38
All online surplus sales are not created equal, Sept., p. 41

**GAC Insight**
A New Administration in Washington, D.C.: Time to tell our public works stories in support of infrastructure programs, Jan., p. 34
Advocacy in a heated political environment, Feb., p. 28
Who's regulating the regulators? March, p. 26
Tax-exempt municipal bonds: how proposed tax reforms will raise property and state income taxes, April, p. 38
Grassroots advocacy, May, p. 36
Investing in transportation: California approves $52 billion to “Fix it First,” June, p. 14
Know your elected officials and your Government Affairs Committee: be connected, July, p. 74
Advocating Underground: Staff and the evolving role of GAC, Aug., p. 86
Advocacy: Who is your target audience? Sept., p. 18
APWA Policy Priorities for the 115th U.S. Congress, Oct., p. 16
PWX Insights, Nov., p. 12

**General**
Building Bridges: Public Works Birthday Parties, Jan., p. 19
Public works professionals pay tribute to fallen Longmeadow public works employee Warren Cowles, May, p. 32
Bloomfield Township joins other agencies to pay tribute to fallen road worker, May, p. 33
Georgetown County celebrates NPWW, July, p. 23
New laboratory internship creates career path for chemistry students, Aug., p. 128
Generate municipal revenue and create professional staff by certifying people and products, Aug., p. 130
Ada County Highway District automates citizen service requests, Aug., p. 138
DeKalb County’s Tracy Hutchinson breaks the proverbial glass ceiling, Aug., p. 146
Georgetown County PW professional recognized by the FBI, Aug., p. 32

**How Did They Do That?**
Impact and recovery from an EF-4 tornado, Jan., p. 39
Success in streamlining state grant funding for local projects, Feb., p. 33
Surfing in Colorado... Really? April, p. 44
Yes, public works directors can lead and be servants too! May, p. 42
Town Hall Meeting with a technological twist, June, p. 20
Are you taking control of your destiny? July, p. 80
Success Story: Cutting through the clutter to make recycling easier, Sept., p. 24
How Santa Clara County projected maintenance resource needs to address staffing shortages, Nov., p. 18

**Imagination to Innovation**
Tin Can, Jan., p. 36
Machines transformed, Feb., p. 30
Headed for Deep Data, March, p. 28
Diamond on the soles of our shoes? April, p. 40
Tiny wind power, May, p. 38
More light from dim bulbs, June, p. 17
Keep the power flowing! July, p. 76
Electrifying roads, Aug., p. 88
Mirror, Sept., p. 20
Tubular transistors, Oct., p. 18
Colorful crystals, Nov., p. 14
Sequencing the sewers, Dec., p. 19

**Inside APWA**
Roger Clark Leadership Conference: A Southern Tradition of Success, Jan., p. 16
Index to 2016 articles, Jan., p. 24
Public works and infrastructure professionals continue to be poised for excellence, Feb., p. 4
Call for nominations to APWA Board of Directors issued, Feb., p. 8
Executive Director Grayson visits with Michigan congressional leaders, March, p. 4
Putting the Pieces Together, March, p. 8
APWA President Ron Calkins testifies at U.S. House Natural Resources Committee, May, p. 4
President-Elect Bo Mills featured at International Association of Defence Council Mid-Year Meeting, May, p. 6
APWA meets with Senator Amy Klobuchar, May, p. 13
Scott Grayson visits San Diego & Imperial Counties Chapter, May, p. 35
Annual Government Affairs spring visit to Congress, May, p. 45
APWA President Ron Calkins attends Iowa Chapter Spring Conference, May, p. 45
One day in Washington, D.C., June, p. 6
Candidates for the APWA Board of Directors named, July, p. 4
The CPWA Board of Directors Annual Meeting in Ottawa, July, p. 8
APWA Board Director Bill Spearman testifies before U.S. House Subcommittee on Water Resources and Environment, July, p. 10
APWA Executive Director Scott Grayson speaks with Representative Ryan Costello, July, p. 11
Exceptional learning application with the Emerging Leaders Academy, July, p. 28
DC DPW joins APWA for NPWW, July, p. 29
Region I Director Rick Stinson attends Newfoundland & Labrador Chapter spring meeting, July, p. 35
Strategic Planning: Enjoy the Journey, Aug., p. 4
New APWA Board member, Sept., p. 5
Board of Directors election results, Oct., p. 11
California chapters meet with California Assembly Speaker Anthony Rendon, Oct., p. 25
Scott Grayson meets with Virginia Governor Terry McAuliffe, Nov., p. 9
Scott Grayson meets with Minnesota Senator Amy Klobuchar, Nov., p. 11
The Official Beginning of the Young Professionals Committee, Dec., p. 12
APWA Hosts Congressional Brief, Dec., p. 16
APWA hosts Representative Costello at Poplar Neck Road Bridge, Dec., p. 16
Scott Grayson participates at 2017 Mid-America Snow and Equipment Expo, Dec., p. 17
President Mills attends the Oregon Chapter’s Fall Conference, Dec., p. 17
Bloomfield Township holds Open House on Oct. 1, Dec., p. 17

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THE MATERIALS ARE DUE BY JANUARY 11.
International Idea Exchange
Preparing for disasters, Jan., p. 42
Vision Zero and other lessons learned in Sweden, Feb., p. 36
APWA announces 2017 Jennings Randolph International Fellows, March, p. 31
What comes next? International development projects evolve after construction, April, p. 49
Online course in asset management attracts great interest, May, p. 46
A new urban culture through planning and civic participation, June, p. 22
Work locally, think globally, Aug., p. 92
Best practices in winter maintenance around the Northern Hemisphere, Sept., p. 26
Municipal Engineering Foundation study tour visit to Chicago, Oct., p. 21
PWX: A Global Gathering, Nov., p. 21
News from the future: Jennings Randolph and Asset Management, Dec., p. 22

Leadership and Management
Succession Planning: How one department did it, Aug., p. 114
Communication: Improve performance and productivity, Dec., p. 27
Leadership and Communication: Effective coordination in a city with rapid growth and development, Dec., p. 31
How do you communicate? Communication is not an acronym, Dec., p. 34
Can you break that down for me? Communicating effectively, Dec., p. 36
Communicating the values, Dec., p. 39
Credibility, hard questions, and trust: a road map to tough communications, Dec., p. 41
How do you communicate when you make a presentation? Dec., p. 46
Avoiding death by PowerPoint™, Dec., p. 49

National Public Works Week
2016 National Public Works Week in Charleston County, April, p. 18
Georgetown County celebrates National Public Works Week, May, p. 16
National Public Works Week in Benton County, May, p. 20
Recognizing and honoring public works during National Public Works Week 2017, July, p. 30
National Public Works Week: Concord Public Works, Concord, Massachusetts, July, p. 34

North American Snow Conference
The Show for Snow heads to the Hawkeye State, Jan., p. 6
The dichotomy between security and adventure, Feb., p. 13
Building for the future in Waukee, Iowa, March, p. 7
Des Moines in pictures, April, p. 14
One for the record books, July, p. 15

Open Your Winter Toolbox
Safety, Jan., p. 37
Sustainability, Feb., p. 31
The Plow, March, p. 29
Thinking about performance measures, April, p. 42
How bad was your winter? May, p. 40
Chance of drizzle today…no worries, June, p. 18
Performance Measures: Dealing with outputs, July, p. 78
Performance Measures: Managing outcomes, Aug., p. 90
Advances in spreader technology, Sept., p. 21
Environmental concerns about chlorides, Oct., p. 19
First steps toward safe and sustainable snowfighting, Nov., p. 16
Second steps toward safe and sustainable snowfighting, Dec., p. 20

President’s Message
Winds of Change, Jan., p. 2

Clean water activism: 45 years later, Feb., p. 2
The fabric of our communities, March, p. 2
Our commitment to preservation and maintenance of public spaces, April, p. 2
Celebrating the community life that public works makes possible, May, p. 2
New public works technology… just you wait! June, p. 2
Transportation Committee: Moving APWA members forward, July, p. 2
What a difference a year makes, Aug., p. 2
Staying connected, lifelong learning, and networking, Sept., p. 2
Managing for change in your organization, Oct., p. 2
What a great time to be a member of APWA, Nov., p. 2
Public Works: the leaders of our communities, Dec., p. 2

PWX
The City Beautiful, the Experience of a Lifetime, March, p. 12
Why we exhibit – and why you should too! April, p. 16
PWX 2017 Special Events: Come home to Florida! May, p. 14
Planning PWX 2017: A pathway to success, July, p.18
Connecting with people in a social media-crazy world, July, p. 22
The passion behind the innovation: an interview with Derreck Kayongo, July, p. 24
Attention Public Works Directors, wanna win a prize? July, p. 25
Orlando in pictures, July, p. 26
It’s a Pool Party and an After Party at PWX 2017! Aug., p. 34
Don’t miss these at PWX! Aug., p. 36
Four options to attend PWX, Aug., p. 37
One-day passes available for PWX, Aug., p. 38
Leading Pedestrian Interval: What are you doing with your five seconds? Aug., p. 39
Alien plant will destroy your city, unless…, Aug., p. 42
Asset management levels of service through the lens of a community, Aug., p. 45
What we can learn about the resiliency of our infrastructure from recent disasters on the Canadian prairies, Aug., p. 47
Empowering maintenance workers to lead innovation from the field, Aug., p. 50
The new golden age of bicycling, Aug., p. 53
Public relations and outreach for a major roadway project, Aug., p. 54
Your entire city is an asset to be managed, Aug., p. 57
Driving innovation with next-level professional development, Aug., p. 60
PWX in The City Beautiful! Nov., p. 24
CPWA at PWX 2017, Nov., p. 33
Diversity: Alive and well at PWX 2017, Nov., p. 37
Moments from PWX 2017, Nov., p. 40
Recognize Your Leaders
Jan., p. 22; Feb., p. 24; March, p. 22; April, p. 34; May, p. 30; June, p. 10; July, p. 46; Aug., p. 20; Sept., p. 14; Oct., p. 12; Nov., p. 8; Dec., p. 14
Small Cities/Rural Communities
Dam Removal: A lengthy public decision-making process leads to a successful outcome, April, p. 24
LED lighting provides a night and day difference to Topeka’s Maintenance Shop, April, p. 28
City Hall improvements and opportunities for Sweet Home, May, p. 22
City of Jefferson: Creating community and infrastructure through trees, May, p. 24
Is a stormwater utility right for your community? July, p. 38
Inexpensive asset management, Aug., p. 12
One small community’s experience with an alternative project delivery method, Sept., p. 7
Solid Waste Management
Roanoke’s Sealed Compactor Program: Serving the market, March, p. 34
Changing Faces: New partners for a complex discard stream, March, p. 38
Solid waste professionals and our quest for waste reduction and diversion, March, p. 43
Moving beyond technical skills in hiring, March, p. 45
Customer-focused process improvements: solid waste employees leading the way, March, p. 47
If you build it, they will come: Phoenix’s Solid Waste Apprenticeship Program, March, p. 50
The process improvement train is leaving – are you on board? March, p. 51
Engaging solid waste employees, March, p. 54
A debris story: Hurricane Matthew, Aug., p. 141
Sustainability
C4S News, May, p. 8
Launching a Sustainability Committee: Bringing together sustainability resources to support local communities, May, p. 11
Raising resiliency in a river town, May, p. 48
Using data to tell your story, May, p. 50
The core components of sustainability education, May, p. 54
The Higher Standard: Triple bottom line decision making for infrastructure, May, p. 56
Centralization versus decentralization systems for wastewater treatment, May, p. 59
An increasing challenge for wastewater systems: wipes, May, p. 62
Asphalt Concrete Pavement: Proven ways to save money and reduce greenhouse gases, May, p. 66
Full-Depth Reclamation: A sustainable pavement reconstruction solution, May, p. 69
Optimizing ROI for SCM sizing and selection via nutrient mass balance, May, p. 71
Tips for drafting legally defensible sustainability policies and thresholds, May, p. 73
Technical Committee News
Emergency Management Committee: Embracing change, Jan., p. 4
Water Resources Management Committee, Feb., p. 11
Solid Waste Management Committee: Focusing on the human aspect of the solid waste industry, March, p. 5
Facilities and Grounds Committee: Focused on networking and education, April, p. 5
There’s a million things I haven’t done…just you wait! June, p. 4
Transportation Committee: Future focused, July, p. 12
In search of ROW’s Mystical Grail, Aug., p. 8
Fleet Services Committee: Raising the bar, Sept., p. 6
Winter Maintenance Subcommittee: Training and innovations for APWA members, Oct., p. 5
Leadership & Management: the Heart of APWA’s Technical Committees, Dec., p. 4
The Life of Leadership & Management: Past, Present and Future, Dec., p. 5

Transportation
Communities take STEPs to build safer pedestrian networks, July, p. 81
Autonomous Vehicles: A profound life-changing revolution, July, p. 84
Technology and systems engineering are changing cities across America, July, p. 87
Local Road Safety: What do we have to lose? Plenty! July, p. 90
City of Port St. Lucie Public Works Department leads the way in innovation and service, July, p. 91
Anatomy of paving practices in Orange County, Florida, July, p. 93
Winning over the “public” in public works projects, July, p. 98
Autonomous Vehicles: Driving their own future? July, p. 100
New quiet zone decreases train noise, improves safety in “Hub City” of Rochelle, Aug., p. 122
High polymer micro surfacing – is more always better? Aug., p. 135
Connected vehicles and road weather, Aug., p. 144
Installation of road plates, Aug., p. 149

Utilities and Public Right-of-Way
Out of sight, out of mind? Are abandoned utilities affecting you? Aug., p. 94
Pipeline failure documentation to minimize failures in the public rights-of-way, Aug., p. 98
Why trenchless? Aug., p. 102
Ground to Cloud: Technology innovation improves safety and underground pipeline management, Aug., p. 104
The City of Port St. Lucie’s programmatic approach to asbestos cement pipe bursting, Aug., p. 107

Washington Insight
Is there reason for optimism for the incoming 115th Congress? Jan., p. 32
ESA modernization necessary for infrastructure investment, Feb., p. 26
Advocacy by committee, March, p. 24
The importance of your voice in advocacy: Emergency Services Sector participation, April, p. 36
GAC Evolution, May, p. 34
APWA members advocate for public works in the nation’s capital, June, p. 12
Public-Private Partnerships: An incentivizing finance tool for transportation projects, July, p. 72
What does “infrastructure” mean to you? Aug., p. 84
Chapter advocacy is essential, Sept., p. 16
Cybersecurity Awareness: Is it too late to start? Oct., p. 14
“Tell Your Story… to Congress!” Nov., p. 10
Working with the media for the benefit of public works, Dec., p. 18

Water Resources
Innovations for Interest: How Iowa is multiplaying the water quality impacts of its State Revolving Fund, Feb., p. 43
Effective Utility Management: An update for all of today’s public works leaders, Feb., p. 47
Raising pints and lowering nutrient limits in Boulder: meeting more stringent nitrogen regulations by adding beer, Feb., p. 51
The inspiring side of infrastructure, Feb., p. 54
Lead and Copper Rule, Feb., p. 57
Ethics in Public Works, Feb., p. 59

Ancient algae are threatening present-day water management, Feb., p. 61
Dixon’s Wastewater Treatment Plant: Meeting state requirements, Aug., p. 112

Winter Maintenance
Salt Brine Fact Sheet, Oct., p. 13
Don’t sweat the small snow: strategies and tips for small event success, Oct., p. 26
The challenges of inclement weather in the Southeast, Oct., p. 29
Implementing large change in snow response, Oct., p. 32
After Snowzilla, D.C.’s Snow Team prepares for upcoming snow season, Oct., p. 34
Keys to effective winter maintenance management, Oct., p. 37
When meeting with Congressional members and staff, or representatives from federal agencies, I often reference my experiences in working with public works professionals, particularly those who work primarily in emergency preparedness, response, and recovery. While working for the City of Southfield, Michigan, I had the opportunity to work very closely with the City’s Homeland Security/Emergency Management Department. When I would spend time in their base of operations, I was amazed by the sheer volume of information the department maintained—either for internal general information purposes or for dissemination. For example, when faced with an above-average amount of snow accumulation over a four- to five-hour period, the Emergency Management Director quickly pulled together the City Administrator, City Planner and Public Works Director to coordinate a plan of immediate action as this snowfall was scheduled to be at its peak during rush-hour. Of course, a standard operating plan was in place, but special attention was paid to informing the community about how the City would address keeping roads clear, and the opening of warming shelters while not inhibiting the flow of traffic. The ability to seamlessly execute the plan was truly reassuring to me as an employee and resident.

Ultimately, we know that public works professionals must be prepared for any and all possible emergency situations. When I share specific past experiences with Congressional members and staff, the responses I receive range from, “How can we (Senate, House of Representatives) bring greater attention to the important work being done by
these experts?” to the very common, “They handle all of that?” Of course, responsibilities do vary from agency to agency, and a few public works operations may have the ability to delegate some responsibilities; however, there are many agencies that operate with only a one-person emergency management “department.”

A recent example of the knowledge and experience possessed by public works professionals was on full display during a Capitol Hill brief, “When Disaster Strikes – A Public Works Perspective.” The brief, hosted by APWA and sponsored by the House Public Works and Infrastructure Caucus this past November, provided those in attendance with an opportunity to hear first-hand the demands placed on public works during events like wildfires and hurricanes and how public works is integral to rebuilding a community left in the wake of these disasters.

The panelists were APWA members Loni Eazell, Sr. Disaster Services Analyst of Los Angeles County, California; Carol Haddock, Acting Public Works Director for the City of Houston, Texas; and former APWA President Brian Usher, Public Works Director for the City of Largo, Florida. The more than fifty Congressional members and staff in attendance were privy to an insider analysis of what takes place in a disaster situation and learned about the tools needed to best meet these catastrophes head-on.

During the brief, the APWA speakers emphasized that disasters rarely provide a heads-up as to when, where and to what degree they will strike. Regardless, public works professionals must be prepared for any man-made accidents or disasters, and those that Mother Nature dishes out. They must maintain an open line of communication with their many partners who place trust in their expertise as they plan for or direct disaster response.

As a member of the APWA Government Affairs team, I can depend on clear, concise and thorough analyses anytime I seek input from our membership. By extension, this provides the APWA Government Affairs team with confidence that we can rely on APWA members to bring solutions to problems arising in the ever-shifting world of emergency management. This allows APWA Government Affairs to better convey the public works story to policymakers, who can then draft informed policy to provide the tools and support for public works and our emergency response partners when disaster does strike.

I would be remiss if I didn’t mention an indispensable tool that we at government affairs depend on: the input we receive from membership. One particular method for members to share their knowledge and skill is through the “Tell Your Story” link located on the APWA website. This tool provides an avenue for you to share your experiences with us and gives us greater ammunition to advocate on the hard work and dedication that you bring to your profession.

I wanted to close with a final observation: Without fail, every single emergency management professional I have encountered has these three attributes in common:

• Dedication – They won’t stop until the job is done, and done properly;
• Desire – They always seek to learn something and are in search of “better practices”; resting on one’s laurels is not in their DNA; last but certainly not least,
• Heart – By this I mean that they care about everything, down to the most miniscule detail, when making sure the people they serve have as much support as possible and their customers can rely on them to be on the job in the most desperate of circumstances.

One article would not do justice to the work put in by such a dedicated group. I look forward to seeing what future best practices are on the horizon in the world of emergency management and the positive impact made from new and forthcoming innovative approaches. Please take a bow if you are a public works professional with responsibility for your agency’s emergency management department, or take a moment to recognize those in your organization who have that duty today for disaster preparedness planning and overall dedication to public service.

Marty Williams can be reached at (202) 218-6732 or mwilliams@apwa.net.

DON’T MISS THIS CHANCE...

TO GET IN THE APWA REPORTER’S SOLID WASTE MANAGEMENT ISSUE
Don’t miss this opportunity to advertise in the March issue which focuses on solid waste collection and disposal, recycling, waste reduction and air quality.

The deadline to reserve your space is February 9
The materials are due by February 13
Bonus: advertise and we’ll give you a free listing in our “Products in the News” column!

CALL FOX ASSOCIATES AT (312) 644-3888
I’ve been moving infrastructure projects on behalf of the public for over 10 years and it’s fair to say that I didn’t have much of a feel for how governmental regulations were intertwined in the public sector when I got started. On the private side, I was a young field operative checking rebar and roadway slopes, but now with the City of Bellingham I submit funding obligations and certificates of material origins (CMOs) to the Federal Highway Administration (FHWA). After my day to day, I get the opportunity to take my experience to Washington, D.C. with the Government Affairs Committee (GAC) each year.

Rules and regulations are constantly changing as the data gets crunched and technology advances. Add the unpredictable changing political tides, and you get the picture. Everything from grant names to checklists are being updated with each new piece of legislation. My first project with the City of Bellingham was a Safe Routes to School project and that was my first taste of federal funding requirements such as Disadvantaged Business Enterprise (DBE) and Buy America provisions. That grant program doesn’t exist anymore and now in Washington State the DBE program is known as the Underutilized Disadvantaged Business Enterprise (UDBE) program.

Over the years I’ve moved quite a few federal projects and gotten more than an earful from my local contractors about various requirements that for right or wrong, are part of the strings attached. Through the GAC, we’ve talked to legislators and staff about these very requirements and related permitting. The question is always, “How can you do more with less?” We share our daily stories about permitting struggles or difficult funding requirements. Providing limited permitting for smaller federally-funded projects (less than $5 million) or allowing for exemptions for Buy America provisions (for a pump station or typical replacement parts) is one of the things that would simplify my own day to day. Discussions and policy ideas to help streamline projects and “do more with less” are just the sort of thing the GAC brings forward when providing policy language to legislators and aides on Capitol Hill. A first-hand example of this was our immediate past president Ron Calkins testifying on Capitol Hill this past spring about the Endangered Species Act (ESA) and California’s permitting contradictions, noting policies that impact my own projects here in Washington State.

Working with the City of Bellingham’s Operations Department to find ways to maximize maintenance money is another day-to-day discussion point that the GAC is talking about on Capitol Hill. How does a Public-Private Partnership (P3) get potholes fixed? These tough questions need to be asked as the current administration looks to fund aggressive infrastructure without new revenue. The GAC continues to support an increase to the gas tax along with developing a user-fee based revenue system. Our trips to D.C. bring the concerns and ideas of APWA into the discussion in order to get those potholes filled at home.

The GAC will continue to take these frontline experiences with us to Washington, D.C. as we brave the security checkpoints and basement cafeterias of Capitol Hill. The next best thing to having our more than 30,000 APWA members with us is having your stories and experiences to share. Please keep them coming!

Freeman Anthony can be reached at (360) 778-7924 or fanthony@cob.org.
any of us will recall a parent’s (or maybe a coach’s or drill instructor’s) admonition to “straighten up” or some similar instruction. Good advice, actually, as I write this hunched over my keyboard while craning my neck to see the computer screen. It seems that poor postures are high on the list of factors increasing the risk of work-related injury, what agencies responsible for occupational health and safety regulations term Musculoskeletal Disorders—MSDs for short. Unfortunately, the precise meanings of good or bad posture are hard to define. Much of the data on MSDs comes from questionnaires administered to workers or from medical and insurance reports; these sources tend to be subjective and reflect conditions after injury has occurred. Researchers in several countries have been using microelectronic sensors to learn more. One scheme for example uses an instrumented safety helmet and pressure-sensitive sensors on shoe insoles; the researchers have been measuring workers’ head motion and position and distribution of pressure on the soles of the feet. From these measurements the researchers try to interpret a worker’s posture and eventually to correlate posture with reported injury or disability. Both data collection and interpretation are challenging; useful results so far are limited but researchers feel the prospects are good.

Top challenges include developing the sensors themselves and ways to attach the sensor to the body that neither impede movement nor pose risks to the wearer, for example from heat or chafing. Also challenging is providing power for the sensors and for the recording devices or radio transmitters needed for data collection.

The technologies are being developed also by medical researchers to improve the functioning of prosthetic limbs for amputees. In this application a primary aim is to restore to the wearer a way to sense the position and movement of the artificial limb without having to watch the movement. The research relies on functioning nerves that survive after the amputation, grafting of muscles from other parts of the body to provide control for the prosthetic limb, and a microprocessor to translate nerve signals into instructions for moving the limb.

The technology being developed for such applications is fundamentally similar to what enables a cell phone or fitness device to count our steps or record our heart rate, of course. One can easily imagine that safety vests worn by workers at construction sites and highway work zones will be fully instrumented to warn of hazards as well as track positions. Perhaps in the future equipment operators will need merely to wave a hand, much like the conductor of a symphony orchestra, to control heavy equipment. For now, however, just remember to look up from your screen when crossing the street, and stand up straight!

Andrew Lemer, Ph.D., is currently a Senior Program Officer with the National Academies of Sciences, Engineering, and Medicine, Washington, D.C.; Member, International Affairs Committee.

Dennis Gabor, awarded the 1971 Nobel Prize in Physics for his discoveries underpinning the development of holography, once wrote, “The future cannot be predicted, but futures can be invented.” Imagination to Innovation is a periodic look at new technology and scientific discovery that we could be using to invent the future of public works.
OPEN YOUR WINTER TOOLBOX

Third steps toward safe and sustainable snowfighting

Wilfrid Nixon, Ph.D., P.E., PWLF
Vice President, Science and the Environment
Salt Institute, Naples, Florida
Member, APWA Winter Maintenance Subcommittee

a issue we talked about how mixing salt and abrasives might not always be the ideal thing to use when applying materials to the road. Based on some feedback on that topic, I thought it would be worthwhile to look more closely at abrasives as a tool, and where that particular tool should be used.

The first thing to note about sand is that it is an inert material, insofar as it does not melt any snow and ice. Some people have suggested to me that some melting occurs because of the color of the sand (which is typically dark), but the excess solar heating that occurs because of an application of sand on a road is minimal in comparison to any solar heating occurring on that road anyway (even on a snow-covered road). I have also found that when melting has been associated with sand, it is because typically a small amount of salt (about 10% or less) is included with the sand in the stockpile to stop the sand stockpile from freezing solid. The bottom line is sand does not melt snow and ice and does not impact the temperature at which snow and ice melt.

This is an important point in the context of levels of service, which you will recall is our goal for any given segment of our road system. If our levels of service call for bare pavements or bare wheel-tracks, sand will not help us achieve that goal, because it does not serve to break the bond between the snow and ice and the pavement. What sand does do for us is to provide a temporary increase in friction. However, in order to supply that increase in friction it has to be located between the tires of the vehicles on the road, and the snow or ice on the road. Unfortunately, experience and a number of studies indicate that the sand does not stay where we need it to be for very long, especially at highway speeds. Studies have found that the friction increase due to sand disappears after between 10 and 20 vehicles have driven over it at highway speeds. So the benefits of sand in terms of increasing friction are very fleeting in high speed and high traffic situations.

In addition, if we hope to get the friction benefits of sand we have to apply at much higher rates than we apply salt. This means that trucks must be refilled more often, and when a truck is in the yard being refilled, it is not out on the road system plowing and applying materials appropriately.

There is a meme that sand is a good thing to use because it has no environmental drawbacks but that is not the case. There are two primary ways in which sand can have negative environmental consequences. First, fine sand or silt in river beds chokes off access of aquatic species eggs to oxygen, endangering their survival. From the point of view of many fish (e.g., trout), a rocky or gravelly river bed is an ideal spawning ground. Abrasives spoil the nature of such river beds and thus reduce their value as spawning grounds, thus potentially putting the breeding of certain fish species at risk. And second, under the action of traffic, sand and other abrasives get ground up and give rise to a lot of dust that can create PM10 problems (PM10 refers to particles less than 10 micrometers in diameter). For example, in both the City of Denver, Colo., and Washoe County, Nev., where air pollution is a particular concern, if abrasives are used in winter maintenance they must be vacuumed up no more than 72 hours after the end of the storm. Such requirements clearly make the use of abrasives an expensive proposition. Oh, and to add insult to injury, the abrasives vacuumed up off the road are classified as hazardous materials, further adding to the cost of their use.

Another meme about abrasives is that they indicate where an agency has been active. That may well be true, but it is not a good reason to use abrasives. If the issue is making sure that the public knows that your agency has been active during and after a winter
storm, then the first step is to ensure that you inform the public about what you are doing and what you are not doing. So, if you are switching from using sand to using salt, you need to let the public know that the roads will be looking different in the winter! In addition to the general public, you may also need to work with your emergency services agencies. It is not helpful to have a police sergeant or sheriff calling up to demand that you put sand on a road when your policy requires you to use salt to get that road to the desired level of service. Those issues need to be dealt with, ideally before they become problems in the middle of a storm! If you think this is still not going to be enough, you can always add a pre-wetting agent to your salt (which is a good idea regardless) that might be suitably colored to make the salt appear similar to the sand.

So, when should we use sand or other abrasives? There are two times when it makes sense. First, if you have roads that have very low levels of service, specifically where the goal is not to achieve bare pavement or bare wheeltracks (because of low traffic volumes or mostly seasonal use, for example), then just plowing and applying sand might be appropriate. Second, if you have to maintain gravel roads then you should only plow and sand them—the use of any freeze point depressant on those roads could destabilize the base during winter months which is not desirable. But other than those two times (and also, if it is part of your policy, as a temporary and localized friction enhancer at places where traffic incidents have occurred), sand is not going to be your tool of choice. Remember, though, that your tool of choice should always be intended to help you achieve your level of service goals. If sand does that, fine, but if it does not, you need another tool!

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Implementing proactive maintenance to reduce operations costs

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In recent years, municipalities and utilities have struggled significantly in managing the complex and diverse assets that are within their jurisdictions for which they are accountable. Public works departments in all divisions have faced severe revenue shortfalls during the Great Recession 2007 through 2013. During this time frame, local governments first reacted by freezing vacant positions and then continued with staff reductions and later severe budget cuts. Even a “same budget as last year” was a budget cut due to inflation and an “across the board” budget cut lacked proper prioritization not considering service levels and needs.

The actions taken to maintain basic services involved delaying hundreds of millions of dollars a year in needed maintenance activities and deferring critical asset renewal and replacement capital projects. As a result of not funding maintenance activities, many assets are now falling below their service levels and failing prematurely not reaching their intended performance life.

As expected, local governments have seen a drastic increase in both maintenance costs and capital replacement needs as the condition of assets continues to decline. Efforts made at the state, regional, county and local levels to better manage assets and allocate limited resources to failing assets and declining services are currently being met with a high degree of frustration due to inconsistent and outdated maintenance practices, neglected asset and cost data tracking and storage, and a lack of data integration abilities with silo/stranded data throughout many departments.

Finance managers are also in shock and disbelief of the increase in funding requests. The incremental, single-digit inflationary annual budget increases of the past are no longer sufficient to properly maintain poor performing assets while still meeting expected service levels. Operations and maintenance budget forecasts are also being distorted as cost projections are being calculated from a high unplanned work order percentage which costs more than planned work maintenance activities. Unplanned, reactive or emergency costs can average as much as three times or more than a planned work maintenance activity.

Managing the maintenance cycle
Managing the maintenance cycle can be a challenging task as infrastructure continues to age, new regulations are passed, the workforce rolls over creat-
ing institutional knowledge gaps, new budget reductions get passed down or too many new assets are added to the list. As these things occur an organization can fall into the unplanned maintenance cycle. It does not matter where the cycle starts, a lack of adequate funding or staffing, it is a constant trap with potentially dangerous ramifications.

Inadequate budget, increasing backlog, missed maintenance, more failures, quick fixes, more rework causing poor morale, slipping service levels, failing standards fall, increasing safety risks and emergency work all combined consumes labor, time and budgets. All of which deters good record keeping which in turn results in a lack of accurate asset data and analysis to support good decision making to provide the evidence necessary for securing additional resources.

**Data mining maintenance records**

The first step in getting out of the Reactive Maintenance Trap is to create and track planned and unplanned work orders. Planned and unplanned work activities should capture the total cost of maintenance for any given asset. The work order should include equipment, labor, and material costs.

Planned maintenance is proactive maintenance. Further defined it can include:

- **Preventive maintenance** that is regularly performed based upon time (quarterly, etc.), runtime (x number of hours), or mean time between failures on a piece of equipment to lessen the probability or likelihood of failure.

- **Predictive maintenance** (PdM) designed to help determine the condition of in-service equipment to predict when maintenance should be performed or **Condition-based maintenance (CBM)** as a strategy that monitors the actual condition of the asset to decide what maintenance needs to be done.

**Unplanned maintenance** is also known as reactive maintenance, corrective maintenance, breakdown maintenance, or run-to-failure maintenance. The trigger for this type of unplanned maintenance is normally a breakdown.

Unplanned maintenance activities can be three times or more costly than planned maintenance. A high percentage of unplanned maintenance can drastically drain financial resources. There can be a huge financial return on any investment which can meet the goal of an 80–85% ratio of planned maintenance activities.

Asset data can be tracked and stored in the GIS geodatabase. An analytics tool is perfect for data mining and can be used for monitoring and reporting important performance ratios using the information in the maintenance records database.
More accurate budgeting can also occur allowing for resources to be more appropriately allocated to high risk assets. Additional benefits include more reliability and cost savings by extending the asset life. Other positive impacts can include the ability to update and improve standard operating procedures, improved data collection and accuracy, analyze and apply new maintenance strategies and develop asset management plans.

**Recommendations**

If an organization has slipped into the Reactive Maintenance Trap, there may not be any new staff FTEs any time soon. The best advice is to start today—determine what the planned and unplanned ratio and costs really are. Next, explain the situation and get buy-in from the field and management on a plan to turn things around. Other steps include:

- Develop a culture of change and cooperation, set realistic goals, track and report progress.
- Operations needs to work closely with the maintenance staff.
- Create a simple checklist of the most common causes of failure and address those first.
- Select the best maintenance field staff and dedicate them fully to proactive maintenance activities.
- Apply condition monitoring techniques which alerts staff about pending failures.
- Contact the CMMS project management team for additional resources and support.

Getting out of the Reactive Maintenance Trap can be a challenge and take time, but it is worth the effort. Planned work over unplanned work can create up to an 18-20% efficiency which can be like gaining a 20% increase in staffing.

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The 2018 Leadership & Management article series will focus on the leaders we sometimes forget about because they lead out in the field: our staff and our crew leaders. We want to focus on their abilities to be the ultimate leader, being the first person into the ditch, the person getting the project started and kept on schedule, and the person keeping laborers and workers motivated to get the job done. They are the true captains on the battlefield with our soldiers doing the great work of public works in our communities. As such, this year’s article series will focus on ways to improve and enhance the leadership of these individuals and thereby improve our work where the rubber meets the road (public works pun intended).

Leadership at all levels, however, starts with taking a good person and improving them through education and experience. In this article, we are going to highlight a unique training opportunity that is thriving in Florida that provides technical skills to our frontline personnel to make them leaders amongst their fellow crew members.

This training is performed through the Public Works Academy at Pinellas Technical College in St. Petersburg, Florida. This organization, one of the first of its kind and one of the longest running, has had almost 25 years of providing high school graduates and technical students with pathways to a career in public works. The Academy provides these services through three mission areas: Cadet Training, Apprenticeships, and Continuing Education.

**Cadet Training** – Similar to our friends in the fire service and law enforcement industries, the Cadet Training provides a rigorous multi-week program to learn basic skills to prepare a candidate for a position in public works. This program incorporates roughly 450 learning hours of instruction, and graduates leave with a certificate and certifications in multiple areas of public works technical fields.

**Apprenticeships** – This program, married with the City of St. Petersburg, provides individuals the training needed to learn vital parts of public works technical specialties while receiving compensation through an actual position with the City’s Water Resources Department. This service provides on-the-job training for students as well as new employees to the City of St. Petersburg.

**Continuing Education** – The training that the Academy offers in both of the aforementioned programs can also be split up for individual certifications or training programs for local public works agencies. This can include Maintenance of Traffic or Commercial Driving training, all the way up to the Public Works Institute for Supervisors and Managers.

The Public Works Academy provides this training because the executives and managers here in Pinellas County know that they are only as good as the people out in the field doing the work. Through this program, our leaders are able to guarantee that we have leaders in the field: individuals who are fully trained, capable, and responsible for the work of our communities. It is through this service that our public works departments continue to thrive and survive the constant changes to our workforce.

If you would like to learn more about the Public Works Academy, including how to set one up in your area, feel free to contact me at chasj@apwaflorida.org or by going to http://www.publicworksacademy.org.

Special thanks to Public Works Academy Secretary Rohland Bryant and current Director of Training Ray Gorman for their assistance in keeping this program working and working well.
Perhaps like many other APWA members, each year I would read the notice regarding the Jennings Randolph International Fellowship program for the upcoming year and think how exciting it would be to travel to another country and experience that country’s public works operations firsthand; but also like so many others, I did not apply. That is, until the fall of 2016. Exposure to ideas, processes, and equipment used in snow and ice control outside of the United States seemed invaluable and the Fellowship was a unique opportunity to obtain that exposure. It was that and much more.

Upon learning that I had been selected as a 2017 Jennings Randolph International Fellow, I recognized that I was interested in more than just the snow and ice control processes in Sweden. Specifically, I wanted to explore how those processes fit within the organizations and how everyone, including other departments and customers, interacted. After I selected three Swedish urban communities to visit (Stockholm, Orebro, and Gothenburg), I provided each city’s contact(s) a series of 48 questions to discuss during the visit. The
questions related to such topics as the details of typical municipal operations, the organizational structure of the city, the separation of responsibilities, relationships (both internal and external), and coordination and cooperation (again, both internal and external).

This was my first time traveling to Europe and my family accompanied me. Our journey started in Stockholm and we spent the next week and a half traveling across southern Sweden, ultimately ending with the SKT annual conference in Gothenburg. Not only did I have the opportunity to spend time with the staff of each city, but my family and I explored the community and surrounding areas, taking in as much culture and, to the occasional irritation of my family, as much infrastructure as possible. While my wife and daughters discussed the castles and Swedish bakeries we discovered, I regaled them with interesting street signs and signals, curbs, right-of-way layout, construction materials, and pedestrian facilities.

Through visiting the three Swedish cities, I learned (maybe “confirmed” is more accurate) that Swedish snow and ice control practices, equipment, and materials are not dissimilar from what we use in the United States; plows, salt spreaders, salt prevetting, and salt brine pretreating of the streets are common to both countries. However, what I did witness was an increased use of technology for safety; more efficient use of material; and maximizing operator productivity. It was quite
unexpected, but I also saw a proliferation of public/private partnerships in snow removal, including everything from minor outsourcing (Orebro) to all operations being outsourced (Stockholm) to entire departments being outsourced (Gothenburg) through very long-term contracts. In both the case of minor outsourcing in Orebro and total outsourcing of operations in Stockholm, the operators and management were very competitive and always looking for ways to increase productivity. Orebro leveraged technology to maximize the productivity of their staff and equipment, with the mindset that if the city staff/department was not more competitive than its private counterparts, the city staff/department could be replaced by those entrepreneurs. In Stockholm, the city snow removal contract was held by a prime contractor, who then hired and managed subcontractors, who individually purchased, operated, and maintained their own snow removal equipment. These subcontractors were energized and focused on providing the most efficient service possible. They were very inquisitive as to Ankeny’s current practices and what I knew of other American and Canadian snow removal equipment, material, and practices.

Perhaps what impacted me the most is the environmental stewardship that permeates the culture in Sweden. In my own responsibilities as an operations manager, I have environmental permits and inspections that have to be performed for air quality and groundwater quality that stem from operating a large diesel generator and a fueling station with in-ground fuel tanks. These are mandates that I dutifully perform. In Sweden, one of the cities explained the annual environmental certification that they were in the process of completing. I asked why they were doing it—was it because of a nationwide mandate? They replied no; they were doing it because they wanted to—specifically they were doing it because they wanted to make sure they were being environmentally responsible. I saw a country that cares, as individuals, as communities, and as a whole, about the environment. The Swedish people communicated this message to their politicians and the politicians to the city staff to implement change to move toward responsible, sustainable practices and policies. As an example, in Stockholm, city staff were tasked with increasing the winter trips taken by bicycle from 20% to 40%. Stockholm is working to accomplish that goal by maintaining the bicycle facilities at a level equal to or greater than that of the vehicle facilities.

This fellowship trip was an incredible experience that I will not forget. Among everything else that I learned and experienced in my time in Sweden, one of my absolute favorites was taking part in the Swedish fika each day and discovering that the love of

“Game of Thrones” is truly universal and it is watched and enjoyed all over the world.

I would like to thank the public works staff from Stockholm, Orebro, and Gothenburg for their hospitality, for generously giving me their time, and for sharing information about their snow removal practices. I would also like to thank APWA National, the APWA Iowa Chapter, and the City of Ankeny for supporting this fellowship opportunity and making it possible.

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Gothenburg Team: Magnus, Robert, Ian and Anna

Orebro Team: Jimmy, Jan, Jonas, Ase and Tommy

“Public Works is a powerful instrument for understanding and peace.” – Jennings Randolph (West Virginia Senator, 1932-1985), known as the “Dean of Public Works Legislators”

Honoring the legacy of Dwight D. Eisenhower, the Eisenhower Institute is a distinguished center for leadership and public policy that prepares the successor generations to perfect the promise of the nation. The Eisenhower Institute at Gettysburg College proudly sponsors several fellowships and residencies which are designed to advance the Institute’s mission of engaging leaders and learners in the fields of public policy and leadership development. For more information on the Eisenhower Institute, please visit http://www.eisenhowerinstitute.org/about/.
When people hear the term first responder, the image of police, fire and emergency medical services usually comes to mind, but at Houston Public Works more than 500 dedicated staff work as a partner to those agencies to keep the community safe, especially during storms like Hurricane Harvey.

**FACT:** Public works was added as a first response agency in 2005 by the U.S. Department of Homeland Security and Federal Emergency Management Agency (FEMA).

**Houston Public Works as First Responders**

Forty-eight hours before the storm hit, Houston Public Works first responders worked to transport Houston police officers to rescue locations across the city.

Eric K. Dargan
Deputy Director
City of Houston
President, APWA Texas Chapter

Houston Public Works: the life of Hurricane Harvey in the eyes of public works
began gearing up to play an important role in the City’s emergency response team. Transportation and Drainage Operations staged barricades and placed dump trucks equipped as high-water rescue vehicles at local fire stations, managers assigned staff to the Emergency Operations Center, and Houston Water staff fueled generators and vehicles, stocked trucks with cones, pulled out sleeping cots, reviewed emergency operation plans and made sure they were prepared for the worst. Houston Public Works Executive Team also was hard at work sharing key information, reminding staff where important City updates would be posted, and finalizing primary and secondary points of contact.

During the storm, Houston Public Works employees drove police and firefighters through high water to rescue people and pets across the City of Houston. The communications team worked to answer media calls in the Joint Information Center and respond to posts on social media. Teams in the Emergency Operations Center updated disaster-preparedness-recovery (DPR) messaging for staff, monitored 311 and fielded requests for resource and staff deployment.

Houston Public Works Executive team attended strategic leadership meetings and press conferences. A team at the Northeast Water Purification Plant played a particularly important role working day and night to keep the City of Houston’s water supply safe from high floodwater.

As the storm passed, and floodwater subsided, Houston Public Works crews worked to remove trees and debris from roadways, get two severely flooded wastewater treatment plants operational, repair traffic signal boxes and—most importantly—assess damage to begin the recovery process.
“Houston Public Works weathered the storm in an incredible way. The dedication and teamwork our department showed during Hurricane Harvey and into this recovery phase has made me so proud. Some unlikely leaders rose during the storm, and I am very grateful and humble to help lead this team,” said Eric Dargan, Chief Operating Officer of Houston Public Works.

Houston Public Works Storm Tips
• **Train** – Safety is a top priority. Make sure your staff is trained to manage emergency operations.

The dedication and teamwork our department showed during Hurricane Harvey and into this recovery phase has made me so proud.

• **Prepare** – Equip staff with the tools they need to get their job done right. Make sure they are prepared with every resource to fulfill their role as a first responder. This may vary from life vests to laptops, to a plan on how they will get meals and breaks.

• **Communicate** – Open and share lines of communication with partner agencies before the storm hits. Have a quarterly meeting with police, fire and public works so teams can get to know each other.

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International Perspective

The challenges of responding to community disruptions caused by major storms are not unique to the United States of course. In October 2013, for example, a large swath of northern Europe was exposed to the hurricane force winds and heavy rain of what has come to be called the St. Jude storm. Uprooted trees, power outages, flooding, and the like halted surface transportation, damaged buildings, and were credited for deaths and injuries in the UK, Netherlands, and France. Many observers think the losses could have been worse had it not been for the advanced warnings from weather forecasters in the preparations by municipal governments for recovery. In the aftermath, municipalities such as Rotterdam have increased their investments to make their communities more resilient, for example, designing parks and other open spaces (Benthemplein Square is a noted example) to double as stormwater reservoirs to reduce flooding.

To learn more:

The Royal Meteorological Society, for example, prepared a brief “case study” report of the St. Jude storm experience in the United Kingdom: http://www.metlink.org/wp-content/uploads/2015/05/St-Judes-storm-case-study.pdf

Rotterdam’s Benthemplein, said to be the world’s first full-scale water square, was completed in 2014 (http://stormwater.wef.org/2014/03/first-full-scale-water-square-opens-rotterdam/ for example). The New York Times in June 2017 published an extensive article on Rotterdam and Dutch efforts to be ready for storms. https://www.nytimes.com/interactive/2017/06/15/world/europe/climate-change-rotterdam.html

– **Contributed by Andy Lemer, Ph.D., International Affairs Committee member**
n early September 2017, Category 5 Hurricane Irma set her sights on the State of Florida. As weather officials and emergency management officials followed the development of the storm, the question became: Where will she make landfall? The entire peninsula of Florida stayed in the cone of influence as to where the hurricane might make landfall.

As the storm approached, 6.5 million people were asked to evacuate Florida’s Atlantic and Gulf coasts along the peninsula. Floridians from the Keys to Jacksonville were asked to evacuate coastal and low-lying areas. This unprecedented evacuation of the Florida peninsula placed severe strains on the state’s transportation infrastructure.

Florida issued evacuation orders early on in the life of the storm as it takes days to evacuate that many people. Floridians moved inland and up the middle of the peninsula. As they moved north, they encountered communities without any space in their hotels and shelters. The order was issued to open all evacuation shelters. Hotels were booked as far north as South Carolina and as far west as Texas. Note: Many of those hotels along the Gulf Coast still held evacuees from Hurricane Harvey in Texas.

The resulting issues surrounding this mass evacuation and the impact on first responders are still being analyzed by the state, the counties and the municipalities. One of the biggest issues was the lack of supplies in stores and fuel at gas stations. This was not a result of a lack of availability of the fuel and supplies but a lack of ability to transport those resources from warehouses/stockpiles to the stores and

Preparation and response to Hurricane Irma: the Florida experience

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City of Gainesville, Florida
Chair, APWA Emergency Management Committee
gas stations. Delivery vehicles could get to the places to re-stock but, due to the gridlock, were not able to return to warehouse/stockpile locations.

At one point, the Florida Highway Patrol was escorting fuel tankers to gas stations because evacuees were running out of fuel and the gas stations were empty. Another report that I received was that independent truck drivers were not taking trips to Florida because they could not get back out due to the gridlock.

As the City of Gainesville sorts through our after-action report, we are documenting our lessons learned as a city and as a public works agency. Here are few action items that were taken leading up to and during the storm that played a key role in our successful response to Hurricane Irma:

**Fuel.** As Hurricane Irma approached, the City worked to keep all of our fuel pumps topped off. We also topped off
each vehicle and piece of equipment at the end of each day. Fuel becomes very important during these times for first responders. For Public Works: it keeps our equipment moving for debris management; it keeps our pumps running to pump flooded areas; and it keeps our generators running for our emergency management center. On the utility side of the house, it keeps lift stations going for sanitary sewer and it keeps water treatment plants running for potable water.

With the issues noted above about congestion, if we didn’t have the plan in place to refuel and keep our tanks topped off, we may have been faced with running out of fuel for our first responders during the event.

Nourishment Supplies for Staff. We have contracts in place for feeding staff with vendors and restaurants. Those vendors and restaurants were also having difficulty obtaining supplies for their own operations and then meeting their contractual obligations with us. Fortunately, in our pre-planning, the logistics section had visited a wholesale club and stocked up on food that allowed them to feed the entire organization during the storm and until supply lines were ungridlocked.

Water. An issue that occurs during major storms across the country (snowstorms, hurricanes, etc.) is the lack of bread and water at the local stores. Florida was no exception during Irma. As soon as a store would get a pallet of water in and place it on the floor, it would be gone in a matter of minutes. Our Public Works Department’s workaround to this problem is that we reached out to our different suppliers. A couple of them actually carry bottled water. We were able to order a couple of pallets of bottled water through that resource to meet our needs for Hurricane Irma.

Sandbagging Operations. During previous storms, the Public Works Department has given out a maximum of 7,500 sandbags during the storm. Floridians are taking these storms more seriously as we gave out 9,000 sandbags on the first day of operations. We gave out 7,000 the second day (all remaining in stock) and ordered more. Traffic lined up all the way through our facility waiting for sandbags. A citizen came through with her vehicle on a tow truck to get sandbags and we had a person on a bicycle get sandbags (shown
on previous page). We provided a limit of 10 sandbags per address. Six was the maximum we could load on the bicycle and the gentleman still be able to pedal.

**Flooding.** Although we did not receive record rainfall, we did have record flooding. Areas of our community flooded that had never flooded before. In general, we are aware of the areas in our community that flood during a significant event or hurricane. We have developed mitigation plans to address these areas to the extent possible. This taxed our resources to respond to the new areas as we had previously deployed most of our resources to the known flood-prone areas. As a result of this flooding and the higher intensity that created it, staff are reviewing our Hazard Mitigation Plan and determining how we need to modify that plan.

In summary, resources were stretched thin across the south as Texas was devastated by Hurricane Harvey and Florida was devastated by Hurricane Irma—both major hurricanes—within weeks of each other. The City of Gainesville’s repeated use of the Incident Command System and Unified Command under the direction of our City Manager led to our success during the response to the hurricane.

The lessons we learned in previous events allowed us to be prepared for this hurricane. The relationships between the first responder departments allowed us to work together in a seamless manner and meet the needs of our citizens. The best example of teamwork is the picture of our Task Force 2 opening streets in our Kirkwood neighborhood. The picture demonstrates law enforcement, fire rescue and public works working together to achieve a common goal. The other picture demonstrates our Unified Command team working together and the pictures together show that we practice unified command from upper management to the responders in the field.

The ultimate vision is to serve the citizens of our community and restore their lifeline’s services in the most timely and efficient manner.

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The second wettest winter on record cut access to the world-famous Big Sur, California, coastline with two historic landslides on State Route 1—one that is still blocking access at Mud Creek to the south, and one that fractured a column and forced the closure of the iconic Pfeiffer Canyon Bridge, built in 1968 to connect Big Sur to Carmel in the north.

Although less than 1,000 people live within the 76-mile coastal stretch, tourists from all over the world visit the area known as the longest and most scenic stretch of undeveloped coastline in the contiguous United States. While the area has a history of slides, this summer Big Sur was isolated from vehicular traffic on both sides.

On Feb. 15, Caltrans and the California Highway Patrol helped locals and tourists cross the canyon and the department permanently closed the old Pfeiffer Canyon Bridge.

Emergency repairs on the edge of a continent: keeping California’s Highway 1 open along the Big Sur coastline

Susana Z. Cruz
Public Information Officer
Caltrans
San Luis Obispo, California
“We knew from the very beginning that demolition of the bridge, followed immediately by its reconstruction, would be a major undertaking with some elements that had never been done before in California,” said Caltrans Structures Engineer David Galarza.

The bridge demolition began in mid-March—a very slow, methodical and precise operation that took nine days. The demolition was completed by using a 6-ton wrecking ball and hoe ram to break the bridge into smaller pieces, bringing down the 315-foot-long concrete bridge with its three spans over six days in mid-March.

Caltrans District 5 employees have a very strong, close-knit relationship with the Big Sur community. Realizing a main artery was cut between north and south Big Sur by car, straining local access and business, an expedited bridge design was developed in only three weeks as opposed to several months. Steel rather than concrete was chosen because it rendered speedier fabrication and was ordered even before final design for the new bridge was complete.

The steel parts were made all over the U.S. and shipped to Mare Island to the XKT Plant in Vallejo for girder fabrication. There, the 62-ton, 62-foot-long steel girders were fabricated by assembling, welding and drilling each girder to produce 15 of them, all in six weeks. The fabricating plant was less than a mile from the Caltrans Materials Department, which allowed for convenient coordination.

The girders were then shipped to a factory in Linden, near Stockton, for painting while bridge work at Pfeiffer Canyon took place concurrently. Abutment construction began in April and was completed in July. After painting, the girders were delivered, escorted three at a time, to be off-loaded one at a time to Pfeiffer Canyon. This was preparation for the girder assembly consisting of three girders and cross members bolted in between each girder, totaling 15. This was in preparation for the launching, which took about two weeks.

The launching, a very methodical process using tension cables to pull the assembled girders, did so 18 inches at a time, after which each pull was thoroughly checked to ensure the proper placement and alignment of the girders. Nine hundred tons of steel were pulled across more than 300 feet over the canyon, guided by a temporary support column in the middle of
the canyon, a feat never before done in California.

Before one could say the bridge was fully installed, it needed to be lowered into place by using special jacks that were programmed to “lower,” instead of the typical “raising” motion done by hydraulic jacks. During most of the accelerated bridge construction, the contractor and Caltrans employees worked very long shifts, seven days a week.

The lowering process took about two weeks to complete. The bridge deck followed. Concrete was used in the diaphragms and deck, traditional in concrete bridges. This was a quick process that only took a few days.

From start to finish, the new Pfeiffer Canyon Bridge only took seven months to complete—a process which normally takes seven years. Caltrans employees and contractors put forth heroic efforts to deliver according to schedule, sacrificing family time and weekends—all the while, very aware of the Big Sur community and their need to regain some normalcy.

“The Big Sur community and travelers from around the world can thank Caltrans for their immediate response to rebuild this bridge, allowing the public to visit this remarkable part of California and enjoy the many attractions along this corridor,” said Kirk Gafill of the Big Sur Chamber of Commerce.

According to Caltrans project manager David Silberberger, a key element for the success of this project was the seamless partnership between Caltrans and the contractor, Golden State Bridge. Because of that, the work was finished quickly and safely, delivering a structure that is ready to serve travelers for the next 75 years.

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The Texas A&M Engineering Extension Service (TEEX) is an internationally recognized leader in the delivery of workforce training and exercises, technical assistance and economic development. In 2016, TEEX served more than 168,199 people from every U.S. state and territory and 82 countries worldwide. A not-for-profit state agency and member of the Texas A&M University System, TEEX offers hands-on, customized training solutions impacting the homeland security, occupational skills and economy of Texas and the nation. The mission of TEEX is to make a difference by providing training, developing practical solutions and saving lives.

TEEX has a proven track record and a strong reputation for providing up-to-date, high-quality training. To illustrate:

• **High Quality Curriculum.** TEEX continually updates the content of courses to incorporate the latest changes in industry standards. Upgrade efforts are accomplished by well-qualified subject matter experts as well as a professional team of Instructional Design Specialists.

• **Hands-on Training Programs.** TEEX produces well-trained technicians who demonstrate proficiency in their job skills and ensure their safety and the safety of others. To facilitate training as many technicians as possible and to minimize travel costs for participants, TEEX can and does travel worldwide to deliver classes.

• **IACET-Recognized CEUs.** TEEX has been approved as an Authorized Provider by the International Association for Continuing Education and Training (IACET). In obtaining this approval, TEEX has demonstrated that its training materials comply with the ANSI/IACET Standards which are widely recognized internationally as good practice. Because of this Authorized Provider membership status, TEEX offers IACET Continuing Education Units (CEUs) for successful completion of its courses.

Leveraging more than 68 years of extension training experience, the TEEX Infrastructure Training Safety Institute (ITSI) division contributes to safer workplaces, enhanced emergency response, cleaner drinking water, and better roads and infrastructure. ITSI offers a highly diversified group of training programs that serve and reach nearly all the skill groups and departments commonly found in local, state and federal government. The programs are also tailored specifically for the needs of industrial and private sector customers and cover a wide range of disciplines. ITSI serves a diverse group, from entry-level and mid-career to supervisors and executives.

This Division offers an Infrastructure Disaster Management Certificate which is designed for professionals who wish to enrich their personal knowledge and skills related to critical infrastructure disaster management and resilience. To receive the certificate, participants must complete four courses which deliver competency-based training.

• **Disaster Management for Public Services, MGT-317,** which provides a unique opportunity for public service professionals to extend their knowledge and skills necessary for protecting their community and infrastructure from potential or actual threats.

• **Disaster Management for Water and Wastewater Utilities, MGT-**

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Chris Walsh, TEEX Adjunct and past APWA Emergency Management Committee Chair, Top Ten Leader, Emergency Management Manager of the Year, Presidential Leadership Award Winner and current member of the Professional Development Committee for APWA; Mark Ray, P.E., Director of Public Works, City of Crystal, Minnesota, and APWA Emergency Management Committee Member.
343, which is designed to provide training to emergency responder professionals on issues that help professionals prepare for, respond to, and recover from natural or human-caused disasters that threaten water and wastewater facilities and systems.

- Disaster Preparedness for Hospitals and Healthcare Within the Community Infrastructure, MGT 341, course brings together those emergency management stakeholders from hospitals, healthcare and the jurisdiction to ensure the resiliency of healthcare infrastructure services in the event of a high-consequence event.

- Disaster Management for Public Services, MGT 317, course brings together jurisdictional planners and management officials who are expected to identify and mitigate hazards, and who plan and manage disaster response and recovery efforts or have emergency management roles within their jurisdiction.

Each of these quality courses is two days long and has a target audience of directors, managers, and operators as well as other disciplines and organizations that can benefit from attending these courses.

These TEEX training opportunities are sponsored by the U.S. Department of Homeland Security and can be brought to your local jurisdiction tuition free. The hosting jurisdiction/agency will need to provide a room large enough to comfortably accommodate the attendees, and a logistical coordinator for the two-day training. While arranging and coordinating the training may seem a bit overwhelming, Mark is going to explain his experience hosting a TEEX course with the hope that it will encourage others to do the same for public works professionals in their communities.

My Experience Hosting Disaster Management for Water and Wastewater Utilities, MGT-343

I had been interested in facilitating TEEX training in the west Minneapolis/St. Paul metro area for several years, but had put off doing it because of my unfamiliarity with TEEX and how the whole process would work. It is my hope that by sharing my experience and lessons learned, I will remove the uncertainty from the process so that other public works professionals will be encouraged to host a TEEX training in their community.

First things first, when planning to host TEEX training the venue is very important. The venue we needed to have for our TEEX course had to have full AV capabilities, parking for all the attendees, and be able to comfortably seat up to 50 people, plus the attendees, and a logistical coordinator for the two-day training. While arranging and coordinating the training may seem a bit overwhelming, Mark is going to explain his experience hosting a TEEX course with the hope that it will encourage others to do the same for public works professionals in their communities.

Once I started to promote the event, I was also responsible for managing the registrations. Managing the registrations was not a challenge; however, one key thing we did that I recommend to others is to make sure the registrants have their FEMA Student Identification Number (SID) when they sign up. Without an SID, their spot was not guaranteed. The SID is required for the student to take the TEEX course. There is no cost to obtain an SID and it can be used for the online training that is offered through the Emergency Management Institute. Collecting the SID at time of registration also makes filling out the paperwork on the first day of class significantly easier as we did not have to chase down attendees’ SID. To obtain an SID, simply visit https://cdp.dhs.gov/femasid/register to complete the online form.

Another key aspect in streamlining the efficiency of the course was that we arranged to have lunch brought in for...
all the participants. By bringing in lunch it allowed us to shorten the lunchtime break, not lose people off campus, and ultimately keep the training time in line with the normal work day for the maintenance staff in attendance.

When advertising for the course, I reached out to those public works professionals that might be interested and tried to focus on neighboring communities that would likely respond to each other in a time of need. By taking this approach, we were providing another opportunity at the local level for communication and professional connections to be made before a disaster strikes. Since the TEEX training course was Disaster Management for Water and Wastewater Utilities we targeted everyone from frontline utility operators to department directors. Many communities sent staff from the various organization levels. Taking this approach was great to see as it reinforced that should a disaster occur, everyone is operating on the same page.

We also contacted our local county emergency management agency, Hennepin County Emergency Management (HCEM), to see if they would be willing to come and briefly talk to the group. The HCEM Director graciously accepted our offer and provided a brief overview of the role HCEM serves and the resources they have to support public works. He also affirmed that the public works discipline in general is a critical component of the community’s ability to prepare for, respond to, and recover from disasters.

One big lesson I learned was that when I host the next TEEX training, I will spread out personnel from the same agency within the room so that they are all not sitting by each other. Taking this approach will hopefully help to improve professional relationships between organizations, allow for a wider range of backgrounds when discussing an issue, and build connections that will be leveraged when disaster strikes. This training provides an opportunity for public works staff from neighboring communities to build professional connections over the two days of training.

Overall, the TEEX training was a success. In follow-up discussions with staff that attended, they all said they got something out of the training and thought it was a good use of their time. Public works professionals are first responders and classes such as this help to reinforce that role and responsibility to the communities we serve.

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Does that look normal? What’s wrong with this picture and why does it just not seem right?

In our day-to-day work life we might not actually say it out loud, or even think it in specific terms, but when something strikes us as odd or out of place our subconscious mind takes note and may send up the proverbial “red flag.” Public works employees are in the unique position to provide eyes and ears in our communities on a daily basis. We have thousands of employees that provide a broad spectrum of services that touch the lives of every individual. Our work provides us with the opportunity to observe and report suspicious activities. Suspicious activity is any observed behavior that could indicate terrorism or terrorism-related crime. Whether a plan for a terrorist attack is homegrown or originates overseas, important knowledge that may forewarn of a future attack may be derived from information gathered by public works personnel in the course of routine operations.

There are two primary programs for reporting suspicious activities.

**SAR: Suspicious Activity Reporting**

The Nationwide Suspicious Activity Reporting (SAR) Initiative (NSI) is a joint collaborative effort by the U.S. Department of Homeland Security, the Federal Bureau of Investigation, and state, local, tribal, and territorial law enforcement partners. This initiative provides law enforcement with another tool to help prevent terrorism and other related criminal activity by establishing a national capacity for gathering, documenting, processing, analyzing, and sharing SAR information. The NSI is a standardized process—including stakeholder outreach, privacy protections, training, and facilitation of technology—for identifying and reporting suspicious activity in jurisdictions across the country and also serves as the unified focal point for sharing SAR information.

**See Something Say Something….**

The “If You See Something, Say Something™” campaign was originally implemented and trademarked by the New York City Metropolitan Transportation Authority and is licensed to the U.S. Department of Homeland Security (DHS) as a nationwide campaign.
In July 2010, DHS launched the campaign in conjunction with the NSI, with the goal of training state and local law enforcement to recognize behaviors and indicators of terrorism and terrorism-related crime. The NSI standardizes how these observations are documented and analyzed and ensures that reports are shared with the Federal Bureau of Investigation-led Joint Terrorism Task Forces for investigation and with state Fusion Centers for analysis.

The “If You See Something, Say Something” campaign is designed more for general public reporting. SAR is designed for professional services in both the private and public sectors. Working together these two programs are designed to receive and organize information in a way that assists in the identification and prevention of terrorist activities. They are valuable programs that help fight terrorism, improve our communities and help keep us safe.

Public works employees spend much of their time around our communities where they are in a position to observe people and gatherings, traffic and vehicles, buildings and infrastructure. When something seems out of place public works team members can—and should—be among the first to recognize suspicious activities, situations and circumstances.

**Protecting Citizens’ Civil Rights & Civil Liberties**

The “If You See Something, Say Something” campaign respects citizens’ privacy, civil rights, and civil liberties by emphasizing behavior, rather than appearance, in identifying suspicious activity.

Factors such as race, ethnicity, and/or religious affiliation are not suspicious. The public should only report suspicious behavior and situations (e.g., an unattended backpack or package, or someone breaking into a restricted area). Only reports that document behavior that is reasonably indicative of criminal activity related to terrorism will be shared with federal partners.

Multiple data gathering sites, called Fusion Centers, are located throughout the United States and U.S. Territories. Each has its own individual name. For example, in Colorado it’s called the Colorado Information Analysis Center (CIAC) and in Utah it’s called the Statewide Information and Analysis Center (SIAC). When suspicious activities are observed and reported, this information is then submitted to the local Fusion Center. The Fusion Centers share and evaluate data in order to look for patterns, trends, etc. Basically, they are in the position to help connect the dots of terrorist plans and designs in order to provide intelligence information back to our law enforcement community. This assists in the identification and prevention of terrorist attacks. Throughout the country, many threats...
and plans are thwarted due to this network of intelligence collaboration. Some of the following activities and behaviors could be innocent—it’s up to law enforcement to determine whether the behavior warrants investigation. The described behaviors and activities are not all-inclusive, but have been compiled based on studies of pre-operational aspects of both successful and thwarted terrorist events over several years. (Provided by the Utah SIAC.)

Suspicious Behaviors and Activities That Should be Reported Include:

- **Eliciting Information.** Questioning individuals at a level beyond mere curiosity about particular facets of a facility’s or building’s purpose, operations, security procedures, etc., that would arouse suspicion in a reasonable person.

- **Testing of Security.** Interactions with or challenges to installations, personnel, or systems that reveal physical personnel or cybersecurity capabilities.

- **Recruiting.** Building operations teams and contacts, personnel data, banking data, or travel data.

- **Photography.** Taking pictures or video of facilities, buildings, or infrastructure in a manner that would arouse suspicion in a reasonable person. Examples include taking pictures or video of infrequently used access points, personnel performing security functions (patrols, badge/vehicle checking), security-related equipment (perimeter fencing, security cameras), etc. All reporting on photography should be done within the totality of the circumstances.

- **Observation/Surveillance.** Demonstrating unusual interest in facilities, buildings, or infrastructure beyond mere casual or professional (e.g., engineers) interest such that a reasonable person would consider the activity suspicious. Examples include observation through binoculars, taking notes, attempting to measure distances, etc.

- **Materials Acquisition/Storage.** Acquisition of unusual quantities of precursor materials, such as cell phones, pagers, fuel, and timers, such that a reasonable person would suspect possible criminal activity.

- **Acquisition of Expertise.** Attempts to obtain or conduct training in security concepts (military weapons or tactics) or other unusual capabilities that would arouse suspicion in a reasonable person.

- **Weapons Discovery.** Discovery of unusual amounts of weapons or explosives that would arouse suspicion in a reasonable person.

- **Sector-Specific Incident.** Actions associated with a characteristic of unique concern to specific sectors (such as the public health sector) with regard to their personnel, facilities, systems, or functions.

- **Breach/Attempted Intrusion.** Unauthorized personnel attempting to enter or actually entering a restricted area or protected site. Impersonation of authorized personnel (e.g., police/security, janitor).

- **Misrepresentation.** Presenting false or misusing insignia, documents, and/or identification to misrepresent one’s affiliation to cover possible illicit activity.

- **Theft/Loss/Diversion.** Stealing or diverting something associated with a facility/infrastructure (e.g., badges, uniforms, identification, emergency vehicles, technology, or documents [classified or unclassified] that are proprietary to the facility).

- **Sabotage/Tampering/Vandalism.** Damaging, manipulating, or defacing part of a facility/infrastructure or protected site.

- **Cyberattack.** Compromising or attempting to compromise or disrupt an organization’s information technology infrastructure.

- **Expressed or Implied Threat.** Communicating a spoken or written threat to damage or compromise a facility/infrastructure.

- **Aviation Activity.** Operation of an aircraft in a manner that reasonably may be interpreted as suspicious or posing a threat to people or property. May or may not be in violation of Federal Aviation Regulations.

Similar to the Utah SIAC list, a concept was developed in Colorado known as “Recognizing 8 Signs of Terrorism™” in a partnership between the Colorado Information Analysis Center (CIAC) and the Counterterrorism Education Learning Lab, also known as CELL. For more information explore www.thecell.org.

**Recognizing 8 Signs of Terrorism™**

1. **Surveillance.** Someone recording or monitoring activities. This may include the use of cameras, note taking, drawing diagrams, annotating on maps, or using binoculars or other vision-enhancing devices.

2. **Elicitation.** People or organizations attempting to gain information about military operations, capabilities, or people. Elicitation attempts may be made by mail, e-mail, telephone, or in person. This could also include eavesdropping or friendly conversation.

3. **Tests of Security.** Any attempts to measure reaction times to security breaches, attempts to penetrate physical security barriers, or monitor procedures in order to assess strengths and weaknesses.

4. **Funding.** Suspicious transactions involving large cash payments, deposits, or withdrawals are common signs of terrorist funding.
5. **Acquiring Supplies.** Purchasing or stealing explosives, weapons, ammunition, etc. This also includes acquiring military uniforms, decals, flight manuals, passes or badges (or the equipment to manufacture such items) and any other controlled items.

6. **Impersonation.** People who don’t seem to belong in the workplace, neighborhood, business establishment, or anywhere else. This includes suspicious border crossings, the impersonation of law enforcement, military personnel, or company employees.

7. **Rehearsal.** Putting people in position and moving them around according to their plan without actually committing the terrorist act. An element of this activity could also include mapping out routes and determining the timing of traffic lights and flow.

8. **Deployment.** Attackers will place all supplies and participants in position to commit the attack. This will be the last chance to alert authorities before the attack occurs.

For decades public works has provided the public with services ranging from traffic and transportation to water and sewer, from telecommunications and power to natural gas and energy, from building codes and inspections to engineering and environmental sciences. The public works community knows how to serve the public. We take pride in providing essential services on a daily basis. Utilizing our personnel and resources to report suspicious activities is one more way we can continue to serve the public in this modern era of dangerous and sinister threats and attacks. Good public works programs and services have good safety programs. Through good safety programs we know that when accidents are avoided, lives, pain and suffering are spared. The same holds true in the prevention of terrorist attacks. Through simple reporting of suspicious activities, lives, pain and suffering can also be spared. SAR training and implementation is important for every public works employee!

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This article includes information from the following sources:

- NSI (https://nsi.ncirc.gov/)
- If You See Something Say Something™ (https://www.dhs.gov/see-something-say-something)
- Utah SIAC (https://siac.utah.gov/)
- Colorado CIAC (https://www.colorado.gov/pacific/dhsem/ciac)
State and local personnel are on the front lines of detecting operational planning and precursor activities related to terrorism. Many of these activities may be disguised as traditional crimes, making it essential for the close coordination between counterterrorism and crime prevention efforts in all jurisdictions across the country. What strategies and programs can be implemented to effectively support this coordination and ensure the sharing of pertinent criminal and terrorism-related information between local agencies and state and major urban area fusion centers?

The Department of Homeland Security and the Department of Justice have supported state and local partners in addressing these issues through the development and implementation of information-sharing capabilities nationwide. These capabilities include support for the development and implementation of state and major urban area fusion centers and fusion liaison officer (FLO) programs.

FLO programs provide an effective way for state and local partners from across multiple disciplines to engage with fusion centers since FLOs serve as liaisons between their agency and the fusion center. They help to facilitate their agency’s participation in regional information exchanges, ensuring their agency is a full partner in the fusion center and information-sharing processes. This program may offer part of the solution to effectively support information sharing between fusion centers and local agencies, in coordination with other initiatives such as the Nationwide Suspicious Activity Reporting Initiative or NSI.

Fusion centers have the ability to fuse and analyze information from multiple sources, jurisdictions, and disciplines into a regional or a state picture and identify events that may otherwise appear unrelated. FLO programs are a valuable tool for supporting fusion centers to build their relationships with multidisciplinary state and local partners. By expanding fusion centers’ networks, FLO programs enable the national network of fusion centers to grow stronger, broader, and deeper. Through these networks the systematic use of partnerships and problem-solving techniques proactively address the immediate conditions that give rise to public safety issues and ensure that resulting intelligence or products inform decision making at both the tactical and strategic levels.

FLO programs assist fusion centers in defining and managing processes that facilitate the two-way exchange of information with frontline person-
nel and decision makers, and provide a scalable and flexible approach for fusion centers to engage with law enforcement and non-law enforcement partners, such as fire services, public works, public health, and other public safety-related agencies. A simple but powerful premise is at the core of any FLO program: training personnel on criminal and terrorist indicators and developing policies and procedures for sharing information in accordance with privacy, civil rights, and civil liberties protections will increase the safety and security of the community. The program enlists representatives from an agency and provides them with the training and tools they need to identify and share critical information during the course of their normal duties. The result is a network of trained individuals who have established relationships in the community and who are able to share information with a fusion center, allowing for further identification and analysis of threats.

FLOs can be enlisted from any state, local, or tribal agency, large or small, rural or urban, and the more agencies represented, the wider the potential reach of the network. The program provides a cost-effective way for small and rural enforcement agencies to get involved in the fusion process and a way for larger, multi-agency regions to coordinate activities. FLO programs are now well-established in many fusion centers throughout the country.

**Engagement of Multidisciplinary Partners**

The importance of the involvement of multiple public safety disciplines and agencies cannot be overemphasized. While the fusion center is the core for the management of the FLO program and associated outreach to participating agencies, the FLO becomes the go-to person for two-way information exchange between the FLO’s agency and the fusion center. To create a wide and effective network, the participation of all agencies in a fusion center’s area of responsibility is needed.

FLO programs have included representatives from such disciplines as law enforcement, fire services, public works, emergency management, public health, and corrections, parole, and probation. Each discipline has access to different pieces of information that are necessary to develop complete situational awareness.

**Daily Activities of an FLO**

Typical activities for an FLO may include reviewing information bulletins or intelligence products disseminated by the fusion center, providing terrorist or criminal indicators awareness training, and fielding inquiries from agency colleagues or the fusion center. The time commitment of an FLO will vary depending on the program.

FLOs have the responsibility to develop the information-sharing network in their own agencies, broadening the reach of the program and increasing the benefit to all members of the agency. Further responsibilities may include conducting outreach to contacts in their agencies; making their colleagues aware of the fusion center and its role in the region; disseminating information from the fusion center; providing criminal and terrorism awareness resources or training to help field officers identify indicators and warnings; and serving as a resource for colleagues.

**Solution to Limited Staffing**

One advantage of the FLO program is that initial operations can be started with existing staffing, monetary, and physical resources. The fusion center and participating agencies can pool resources to make a larger impact or leverage allowable DHS grant funds to support the program. Some existing FLO programs have been started with just such minimal assets until the value of the program is established and widespread support is gained. An FLO program is also an ideal way to ensure that smaller agencies are involved in the fusion process.

**Beyond a Basic FLO Program**

Many fusion centers have realized additional value from broadening their network of FLOs. Some programs have added responsibilities to support analytic efforts, incident response, special events, and critical infrastructure protection.

- **Incident Response:** Some fusion centers have built a strong incident response component into its FLO program. For example, FLOs may respond to incidents and act as the “on the ground” liaison between the fusion center, incident commanders, and outside agencies. Such engagements may include responding to incidents involving tactical operations, hazardous materials, or other extraordinary circumstances.

- **Special Event Support:** FLO programs can be leveraged to support information gathering and situational awareness capabilities at special events. FLOs can provide critical information that can assist an incident commander with making real-time resource allocation decisions.

- **Critical Infrastructure Protection and Assessments:** FLOs can support the protection of critical infrastructure, as well as the completion of assessments, often leveraging their multidisciplinary expertise. For example, FLOs may develop relationships with critical infrastructure owners and operators and develop threat and vulnerability assessments.

**Conclusion**

FLO programs offer the opportunity for state and local agencies to engage with their fusion centers and participate in the information-sharing process. This information exchange allows local agencies to expand what they have been doing for years—gathering and sharing information to detect and prevent criminal activity, including that associated with terrorism.

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Over a two-day period during the 2018 Memorial Day weekend, more than 2,500 gallons of diesel fuel were stolen at a County of Los Angeles Department of Public Works field yard. Proper notifications and police statements were completed to report the thefts; however, there was a concern that this could be part of a bigger terrorism plot that if left uncoordinated could be the missing component needed to complete the whole picture of a nefarious plan.

As an advocate of the “See Something, Say Something” campaign, the Department contacted the Joint Regional Intelligence Center (JRIC), which is the local fusion center to discuss the theft and see if any further action would be needed.

As background, the JRIC was established in 2006 as a cooperative effort between federal, state, and local law enforcement and public safety agencies to centralize the intake, analysis, synthesis, and appropriate dissemination of terrorism-related threat intelligence for the greater Los Angeles region. The JRIC area of responsibility includes the counties of Los Angeles, Orange, Riverside, San Bernardino, San Luis Obispo, Santa Barbara, and Ventura, covering nearly 40,000 square miles and home to more than 18.5 million people with nationally critical assets and key resources.

The JRIC was instantly interested in the theft and began an investigation. Working with Department personnel, a JRIC representative conducted a security inspection of the gates, yard, fueling stations, reviewed the video files and the local police reports. Several meetings were conducted between JRIC representatives and with key staff members to ensure all the factors had been presented, reviewed and discussed amongst all parties.

While the diesel fuel theft did not reveal any nexus to terrorism, it was a good opportunity for the Department and the JRIC to work together to try to connect any intel that may have been an instrumental piece in thwarting a potential attack. Through this collaboration, the Department identified ways to further secure the facility to prevent additional fuel thefts. At the culmination of this process, a news report provided the most likely scenario for the diesel fuel thefts—it was stolen to be sold on the “black market.”

Public works agencies should reach out to their local fusion centers to ask questions or just to request a tour of their operations. Even better, ask for a seat in the fusion center. Fusion centers should not be viewed as a secretive operation or just a law enforcement entity. Without the intel, coordination or collaboration of local agencies, fusion centers do not have an accurate view of the whole picture. In a cooperative way, public works departments need to insert themselves into that intelligence component—we have eyes and ears in the field that could provide critical intel.

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National Weather Service Radar: Radar 101

National Weather Service Radar is a critical tool in monitoring and forecasting various weather conditions. Understanding how the radars work and knowing what they can and can’t detect are essential for anyone who uses the radar data.

WSR (Weather Surveillance Radar) Basics

Nearly all the radar data available through the National Weather Service, media outlets, and other private vendors originates from the NEXRAD (Next Generation Radar) Network of WSR-88Ds, owned and operated by the National Weather Service. NEXRAD radars cover the vast portion of the United States, especially in the more populated areas. The included map (Figure 2) shows the coverage across the contiguous United States by the NEXRAD Network at elevations below 10,000 feet above ground level. Beyond just providing radar coverage of the country, there are additional reasons for the dense, and sometimes overlapping coverage. A dense network of radars is required because the radar beam gains altitude as it travels farther from a radar site, primarily due to the curvature of the earth and the slight upward angle the beam takes from its origination point. For example, if thunderstorms were occurring in northern Minnesota, the Chanhassen, MN (near Minneapolis) radar would overshoot the storms because of the distance between the radar and the storms. In short, the radar would not see the storm. To address this technical limitation, most radar displays available to the public use a mosaic display. A radar mosaic takes the radar data from several radars, and displays all...
the data on one map simultaneously. The mosaic radar image demonstrates the capability of the radar network in bringing together multiple radars to cover almost all of the contiguous United States with radar data.

**How the Radar Detects Precipitation**

The WSR-88D radar sends pulses of radiation in all directions from the radar antenna. A portion of that radiation is reflected back to the radar by any precipitation it reaches. Then, algorithms are run on the returned radiation to compute how far away and in what direction the precipitation was. At the most basic level, the algorithm measures the time it took for the radiation to be sent out and return to the antenna to calculate distance and where on the antenna the return pulse hits to determine what direction it came from. When completing a full scan of the atmosphere around the station, the radar sends its first (base level) radiation at an elevation angle of 0.5 degrees (where 0 degrees is straight horizontal). After the radar completes its base level scan at that 0.5 degree elevation angle, it will go to the next elevation angle and do another scan. This process continues with the angle increasing with each scan until the radar has completed its scan at the highest elevation angle in the predetermined cycle. Elevation angles are determined by which Volume Coverage Pattern (VCP) the radar is operating in. During times of quiet weather patterns, a clear air VCP is commonly used for general monitoring. The slower scan rates and fewer elevation angles do not cause as much wear and tear on the radar as a faster scan rate with more elevation angles. During times of active weather though, a precipitation VCP is common as it has a fast scan rate and several additional elevation angles to scan. This faster and additional data is important for monitoring and analyzing any precipitation, especially thunderstorms. NWS meteorologists manually change the VCP the radars operate in to best fit the weather situation. The ability to scan several elevation angles allows meteorologists to see several different height levels within a weather system. This data is critical in assessing the strength and development of thunderstorms, for example.

**Reflectivity and Velocity**

The radar depiction of precipitation is called “reflectivity.” Simply put, the heavier the rain is, the higher (more intense) the reflectivity will be. If there is hail in a storm, the reflectivity will typically be even higher because the beam is hitting a solid (hail) which is more reflective than liquid (rain). The radar also has the ability to detect the velocity of the precipitation within a...
storm. This velocity data is the primary way meteorologists can see rotation in a thunderstorm and the potential for straight-line winds. Figure 4 is an example of reflectivity and velocity data taken at the same time from the same storm.

**Supercells and Tornadoes**
The images in Figure 5 are an example of a supercell thunderstorm. The image on the left is the reflectivity and the image on the right is the velocity. Of important note is the hook shape in the reflectivity in the bottom left portion of the storm which is referred to as a “hook echo.” The velocity data for the same storm (right image) reveals very strong rotation in the hook echo, indicative of a threat for a tornado.

**Base vs. Composite Reflectivity**
The NWS website (weather.gov) allows anyone to view base or composite reflectivity products. The base reflectivity simply displays the lowest elevation

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**Figure 4.** This is an example of radar reflectivity (left) and the velocity (right) at the same time. The reflectivity indicates the intensity of precipitation in storms. The velocity data samples the wind speed and direction relative to the radar location. The green colors indicate the winds are approaching the radar, and the red colors indicate the wind is going away from the radar. Brighter colors indicate stronger wind speeds.

**Figure 5.** The image on the left is the reflectivity of a classic supercell thunderstorm. The image on the right shows the velocity of that same supercell, with very strong rotation in the hook echo, where a tornado was occurring at the time of this image.
angle the radar is sampling (0.5 degrees noted previously) and is typically the best product to view for basic analysis. The composite reflectivity product displays the highest reflectivity detected at any level from the various elevation angles. Put another way, the composite reflectivity show the most intense return of the entire scan cycle. This means that precipitation may look more intense than it really is due to various factors including evaporation. Most of the time a viewer will want to see the reflectivity at the lowest elevation angle as it is the closest to the ground and is most likely the precipitation that will be observed.

**Overshooting Radar Beam**

As discussed previously, the radar beam gains elevation as it travels away from the radar. Sometimes, the beam overshoots precipitation in the atmosphere. This can be especially common in the winter as precipitation-producing clouds aren’t as tall as typically seen in the warm season. Overshooting beams can cause confusion for viewers not aware of this issue. Overshooting beams can miss the core of a storm or cause the storm to appear smaller than it really is. Locations that are far away from any WSR-88Ds are very susceptible to seeing lower reflectivity values, especially in the winter, for a given storm as compared to the reflectivity values for similar weather events that are closer to the radar stations. Figure 6 shows the overshooting issue as the radar beam travels away from the antenna.

**Contact your local NWS office**

The mission of the National Weather Service is “the protection of life and property and the enhancement of the national economy.” There are 122 NWS offices in six regions around the United States that are staffed 24 hours a day, 7 days a week. Public works agencies at all levels are strongly encouraged to call their local office if they have any questions about the forecasts or other weather-related questions. The NWS also appreciates weather reports from people in the field. Public works staff are generally out in the elements and can be great eyes and ears for the National Weather Service.

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Upcoming Click, Listen & Learn webinar: “National Weather Service and Public Works, a Natural Partnership”

National Weather Service staff from around the country will provide information to participants on NWS weather products that may be useful to public works operations (including Storm Prediction Center forecasts), a basic tutorial on how the NWS weather radar network works, an introduction to the Weather Ready Nation effort, and other weather-related topics.

January 25, 2018, 10:00 a.m.–12:00 p.m. Central

https://www.apwa.net/MyApwa/Events/Event_Display.aspx?EventKey=CLL012518

Figure 6. This graphic shows how radar can sample lower in a storm that is closer to the radar and can overshoot storms that are far away. This demonstrates why it is important to have a dense radar network.
Introducing GOES-R

The Geostationary Operational Environmental Satellite-R Series (GOES-R) is the next generation of United States geostationary weather satellites. The four-satellite series provides continuity for the National Oceanic and Atmospheric Administration (NOAA) GOES program begun in 1975. Information from the GOES-R series will significantly improve the detection and observation of environmental phenomena that directly affect public safety, protection of property, and our economic health and prosperity.

The GOES-R series provides advanced imaging with increased spatial reso-
olution and faster coverage for more accurate forecasts, real-time mapping of lightning, and improved monitoring of solar activity. GOES-R launched in November 2016 and was renamed GOES-16. The next satellite in the series, GOES-S, is expected to be launched in 2018 and will become GOES-17 upon successfully reaching orbit. The orbit for a geostationary satellite is approximately 22,000 miles above the Earth’s equator, following the Earth’s rotation (moving at approximately 3km/sec). Appearing motionless to ground observers, a satellite in this orbit can easily communicate with a fixed antenna on the ground. Commonly used for both weather and communications satellites, this orbit is home to hundreds of satellites. Geostationary weather satellites have the advantage of providing continuous day and night coverage of the entire hemisphere below.

The United States operates two GOES: GOES-East is stationed above the equator at approximately 75° West longitude and GOES-West at approximately 135° West longitude. With these two operational satellites, the U.S. provides regular imagery with a consistent view of the earth to monitor both North and South American continents, as well as much of the Atlantic and Pacific oceans.

**Vastly Improved Imaging**

The primary, earth-viewing, instrument on the GOES-R series is the Advanced Baseline Imager (ABI). ABI imagery caught the public’s attention almost immediately upon release and gained in popularity as broadcast meteorologists began to make heavy use of the imagery both on air and over social media during the devastating 2017 hurricane season, particularly during Hurricanes Harvey, Irma, and Maria. ABI provides three times more spectral bands (with 16), four times greater spatial resolution (between 0.5, 1.0, and 2.0 km), and five times faster imaging over the previous generation GOES imagers. Though technically not a camera, it does provide digital imagery of the planet that most observers would think of as pictures from space. The 16 different spectral bands cover the electromagnetic spectrum from the visible light that we can see with our naked eye out to the infrared (which measures the heat of the radiating surface).

The ABI will help improve weather forecasting through improved forecast models. In addition, the ABI will be used to monitor a wide array of environmental hazards that affect us including fog, wildfires, smoke and dust, volcanic ash and turbulence for aviation safety, and of course severe weather events. The ABI will primarily be used in a mode that covers three separate sectors: the full disk (every 15 minutes), a smaller sector which is stationary in location and was designed in size to cover a bit more than the entire Contiguous United States (CONUS) every five minutes, and two smaller 1000x1000km sectors called mesoscale sectors, which can provide one-minute imagery. Animations of one-minute imagery can be found online for hurricane imagery. Lightning Mapper (GLM). As research- ers learn how best to use these new data, compelling research already shows how lightning characterization during severe weather can improve the lead time for predicting tornadic activity. The lightning mapper on GOES-R allows scientists to see lightning that is occurring inside of the clouds, where ground-based systems cannot detect it. It also gives us the ability to see lightning in areas where ground-based systems are not available, such as over oceans. It is anticipated that the combination of one-minute imagery from ABI and the super-rapid lightning mapper data, will provide decision makers with crucial information about how a storm is developing, the path the storm is taking, and where the most dangerous spots are—especially when combined with expert knowledge from the National Weather Service and others.

**Space Weather**

While most of us don’t think much about weather in space, NOAA constantly monitors the space environment for our nation’s space-bound assets, including the health and safety of astronauts aboard the International Space Station as well as our communication and navigation systems. A solar storm could even impact our power grid or aviation over the poles. Space weather is caused by electromagnetic radiation and charged particles being released from solar storms. GOES-R monitors space weather using a suite of instruments that measure solar ultraviolet light, X-rays, and the magnetosphere. Observations from these instruments will enable NOAA’s Space Weather Prediction Center to significantly improve space weather forecasts and provide early warning of possible impacts to Earth’s space environment and potentially disruptive events on the ground.

**Unique Payload Services**

Traditionally, GOES has provided a platform to disseminate other important (primarily emergency) data that does not originate from the instruments onboard, and that mission will continue with the GOES-R Unique Payload Services (UPS) suite. This suite consists of transponder payloads providing communications relay services and includes the Data Collection System (DCS), the High Rate Information Transmission/Emergency Managers Weather Information Network (HRIT/EMWIN), GOES Rebroadcast (GRB), and the Search and Rescue Satellite-Aided Tracking (SARSAT) system. The Data Collection System is a satellite relay system used to collect
information from Earth-based data collection platforms that transmit in-situ environmental sensor data, such as stream or river flow, tide-levels, weather conditions, etc. In the GOES-R era, the number of user-platform channels will expand from 266 to 433.

The Emergency Managers Weather Information Network (EMWIN) is a direct service that provides users with weather forecasts, warnings, graphics, and other information directly from the National Weather Service (NWS) in near real time. The GOES EMWIN relay service is a method to obtain these data and display the products.

Another service of GOES is their role in the international Search and Rescue Satellite Aided Tracking (SARSAT) system. The SARSAT system uses NOAA satellites to detect and help locate aviators, mariners, and land-based users in distress. Distress signals from emergency beacons on aircraft, vessels, and from handheld personal locator beacons (PLBs) are picked up by GOES and relayed to ground stations and routed so that a rescue coordination center can respond. In the United States alone this system has helped to direct the rescue efforts for hundreds of people each year (over 300 in 2016). The SARSAT transponder was modified slightly for the GOES-R series to operate with a lower uplink power (32 dBm), enabling GOES-R satellites to detect weaker signal beacons.

World Leaders
The field of satellite meteorology began in the 1950s at the University of Wisconsin-Madison in partnership with NASA, and the United States remains a leader in research and technology in this field. As part of this tradition, the GOES-R program represents the best of strong partnerships between government, academia, and industry. NOAA’s GOES-R provides continuity of services that benefit citizens and businesses at home and around the globe. The data are freely available in real time to anyone with the proper antenna or archived online via NOAA’s CLASS; software to ingest, decode, and visualize the data will be freely available from researchers at the University of Wisconsin-Madison. Compared to the previous generation of geostationary satellites, GOES-R will provide more information at finer spatial resolution and faster than ever before. These improvements will lead to more accurate and timely weather forecasts—information that we all depend on, whether for our jobs, hobbies, or just knowing whether or not we’ll need an umbrella. For more information about GOES-R, see www.goes-r.gov.

Mathew Gunshor is a researcher at the Cooperative Institute for Meteorological Satellite Studies (CIMSS), an NOAA-sponsored cooperative institute at the University of Wisconsin-Madison. He has been working alongside NOAA on the GOES-R ABI since 1999, with projects that include the original band selection studies, waiver analysis during instrument fabrication, the Imagery Team, and ABI training for the National Weather Service and broadcast meteorology community. The views expressed in this article are his and should not be taken as official NOAA or government policy. Mathew can be reached at (608) 263-1146 or matg@ssec.wisc.edu.

“For the sake of our security, our economy and our planet, we must have the courage and commitment to change.”

– Barack Obama, President of the United States (2009-17)
It is well known within the weather forecasting community that the United States experiences the most extreme weather events in the world. Hurricanes Harvey, Irma, and Maria, along with all the fires in the western United States, reminded us of that in 2017. Tornado outbreaks can shatter communities in the central and southeastern parts of the country. Historic flooding can flip-flop with crippling drought. Blizzards can paralyze the entire Northeast. Residents of the United States see it all, and the emotional and financial impacts can be staggering. Economic losses from extreme weather events are measured in the billions of dollars annually, and it’s impossible to put a price on lives lost by these events.

With extreme weather events seemingly commonplace on the national evening news, you may think more should or could be done before a natural disaster becomes a human disaster. This is where public works professionals across the country can collaborate with the National Weather Service’s strategic initiative “Weather-Ready Nation.” In addition to the fact that weather impacts nearly all public works operations on a daily basis, how many times have you seen videos of cars and trucks driving through flooded roadways, often resulting in tragedy? Or people looking up at the sky when a bolt of lightning strikes nearby, yet they fail to vigorously head to shelter? How many times have you seen a news reporter interview a survivor who was shell-shocked at how violent Mother Nature can be, with a common reaction, “I never thought it would be this bad?” Instead of taking a reactive position to these events, the National Weather Service is taking a proactive stance through the Weather-Ready Nation initiative. Through this Weather-Ready Nation initiative, the National Weather Service (NWS) is leading the way by evolving its products and services so that better weather-related decisions can be made by businesses, communities, local governments, and individuals.

While leading the effort, the NWS, the federal government’s authoritative source for weather warnings, is joined by thousands of organizations across the country that are collectively working together to build a “Weather-Ready Nation.” These organizations represent America’s weather industry, emergency management community, and any organization that shares the goal of building a Weather-Ready Nation. This is where members of the American Public Works Association, and the communities they serve, can join this Weather-Ready Nation initiative and serve as “Ambassadors.” The NWS and its parent agency, the National Oceanic and Atmospheric Administration (NOAA), recognize that the federal government can’t succeed at this ambitious goal alone and it is only through strong collaboration with the Ambassadors that we can collectively build a truly Weather-Ready Nation.

Interested in becoming a Weather-Ready Nation Ambassador? Go to www.weather.gov/wrn/ and click on the “Ambassadors” tab or e-mail wrn.feedback@noaa.gov stating your interest for more information.

As the name implies, WRN Ambassadors share the goals of minimizing the loss of life and property from extreme weather in the communities they serve. The stakes are high, and with
continued population growth with increasing density, expanding development into more vulnerable areas, and the uncertainties of climate change, these stakes will likely get higher. Public works professionals are already on the front lines of preparing for and responding to weather-related events. But through the Weather-Ready Nation effort, free resources are provided by which public works professionals can further educate and help prepare others to make better weather-related decisions for their communities, businesses, and as individuals. Together we all win.

So, what exactly is NWS doing through this Weather-Ready Nation initiative? The NWS has 122 local forecast offices across all 50 states and territories. Each office is working more closely with emergency managers, water resources managers, government agencies (such as public works), and utilities, to provide impact-based decision support—or more plainly, linking weather forecasts to expected weather impacts. This impact-based decision support requires intimate knowledge of the decisions that need to be made, and when they need to be made. This is why communication and improved professional connections between public works professionals and their local NWS office is a critical component of the Ambassador initiative. The NWS believes that the Ambassador initiative opens the door through which these collaborative efforts at the local level can flourish.

Another big component of building a Weather-Ready Nation is the integration of social science research into the weather forecast process. How are people going to interpret forecast information? Will the information result in the appropriate action? To answer these questions, social and behavioral scientists are working alongside meteorologists. Whether it is the information itself, or how that information is communicated, there is the potential to make big improvements in the outcomes of extreme weather events. A great example of the importance of connecting the weather with the impacts recently was with Hurricane Matthew. Matthew was a major hurricane tracking up the coast of Florida threatening coastal communities from Miami to the Outer Banks of North Carolina. Communities seemed better prepared for the winds and storm surge than the less attention-grabbing threat.
of flooding rains. Yet, Hurricane Matthew may be remembered more for the catastrophic flooding in the Carolinas. Hurricane Harvey brought with it the incredible challenge of imagining what 50-plus inches of rain would do to low-lying communities. Clearly, public works professionals were on the front lines of responding in these communities and working to restore life to normal.

The impacts imposed by recent hurricanes and wildfires point to the challenge of communicating risk and changing people’s behavior—for example, not to drive across flooded roads. This is where Weather-Ready Nation Ambassadors can make a profound difference in our communities. Hearing the dangers from one source cannot compare with hearing the same message of potential dangers from multiple sources, including local officials.

The National Weather Service, with 122 local forecast offices across the country, is eager for potential opportunities to collaborate and support the public works professionals by building local connections. Please do not hesitate to reach out to your local NWS office (https://www.weather.gov/stormready/contact), have your department join the Weather-Ready Nation effort (https://www.weather.gov/wrn/about), and help us start the conversation. Questions we can work to answer together include: How can we better partner together? How can we work together at the local level and personalize the risk? How can we create an outreach campaign tackling the dangers of flooded roadways? What messages work with the public to change behavior? These are only a few questions both of our professional communities can and should be asking each other so that together we can be better and make our communities safer.

Please have your organization or agency consider becoming a Weather-Ready Nation Ambassador, and work with NOAA and NWS to help save lives and protect property. There is no cost to join or be a member and the results will be mutually beneficial to everyone.

Douglas Hilderbrand can be reached at (301) 758-8330 or douglas.hilderbrand@noaa.gov.

Infographics like this one for flooding risk can easily be shared via social media. Follow us @WRNAmbassadors

Being a Weather-Ready Nation (WRN) Ambassador has been a huge benefit to the Crystal Public Works Department and the City of Crystal. We use the infographics and other social media messaging from NWS on our City’s social media accounts. The information is relevant and timely, and is beyond the scope of anything we could produce in-house. In addition to the storm event specific information, we also get resources to share for public education campaigns such as Severe Weather Awareness Week or Winter Weather Awareness Week. Finally, being an Ambassador has further strengthened the collaboration and communication with our local NWS office. As we all know, weather is a significant factor in all we do in the public works profession and the strong partnership has helped us with decision support information for our operations. – Mark Ray, P.E., Director of Public Works, City of Crystal, MN
ETHICS FOR PUBLIC WORKS PROFESSIONALS
This course is designed for individuals that are interested in exploring ethics, as it applies personally and professionally. This course provides practical advice on ethics and emphasizes the importance of ethical behavior in personal and professional interactions. It provides real-world examples, as well as advice in dealing with the non-technical aspects of our profession.

ETHICS FOR PUBLIC WORKS SUPERVISORS
This course is designed for individuals that are interested in exploring ethics, as it applies to supervision and management. Ethics are complicated. Sometimes public works professionals are faced with difficult public policy choices that may stretch our ethical boundaries. Leading in the context of our own ethics is challenging enough, but leaders must also manage the ethics of others and discover how to create and maintain an ethical culture. Public Works leaders must walk the talk, set the tone, hold themselves accountable, and strive to create a culture of openness, democracy, merit, and creativity. Only by exercising the principles of ethical leadership can we meet the challenges of the future and sustain the public’s trust in our decisions and stewardship of public resources.

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<table>
<thead>
<tr>
<th>Date</th>
<th>Event Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>January 22-25</td>
<td>CSM, CPII and CPFP Certification Exams (computer-based testing)</td>
</tr>
<tr>
<td>January 25</td>
<td>National Weather Service and Public Works, a Natural Partnership</td>
</tr>
<tr>
<td>February 22</td>
<td>Innovative Financing for Water Resources</td>
</tr>
<tr>
<td>March 19-22</td>
<td>CSM, CPII and CPFP Certification Exams (computer-based testing)</td>
</tr>
<tr>
<td>May 6-9</td>
<td>2018 North American Snow Conference, Indianapolis, IN</td>
</tr>
<tr>
<td>May 21-24</td>
<td>CSM, CPII and CPFP Certification Exams (computer-based testing)</td>
</tr>
<tr>
<td>July 16-19</td>
<td>CSM, CPII and CPFP Certification Exams (computer-based testing)</td>
</tr>
<tr>
<td>August 26-29</td>
<td>2018 PWX, Kansas City, MO</td>
</tr>
<tr>
<td>September 17-20</td>
<td>CSM, CPII and CPFP Certification Exams (computer-based testing)</td>
</tr>
<tr>
<td>November 12-15</td>
<td>CSM, CPII and CPFP Certification Exams (computer-based testing)</td>
</tr>
<tr>
<td>May 19-22</td>
<td>2019 North American Snow Conference, Salt Lake City, UT</td>
</tr>
<tr>
<td>September 8-11</td>
<td>2019 PWX, Seattle, WA</td>
</tr>
</tbody>
</table>

= Click, Listen & Learn program (Free to Members)
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APWA members may access past Click, Listen & Learn programs from the Members’ Library at no cost. Programs can be streamed to your computer via the link found in the library.

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Products in the News

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BrandFX™ to consolidate production capabilities in Iowa
In an effort to streamline and centralize its production, BrandFX, manufacturer of composite bodies for service and line trucks, announced its production move to Pocahontas, Iowa. The move is designed to help the company optimize manufacturing operations and efficiencies for its composite bodies. The plant in Pocahontas currently handles 35% of BrandFX’s total production and is receiving a facilities investment in excess of $1.5 million. This infusion will accommodate the increase in production. Additionally, the Pocahontas plant is home to many of the company’s most senior composite production experts.
BrandFX is headquartered in Fort Worth, Texas, and has over 33 years of expertise in composite body design and construction. For more information on this directional move, please e-mail or call President Gary Heisterkamp at GHeisterkamp@brandfxbody.com or (866) 431-1131.

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Concordia Care, Inc. is a specialty risk transfer, care-coordination company servicing insurers, government entities, self-insured plan sponsors and other managed care organizations. Through its Pathways 2 Recovery care model, Concordia aims to improve patient-centered outcomes and reduce overall cost of quality care by applying best practices in a biopsychosocial-centric approach to manage complex challenges for the group health, casualty and auto markets. Concordia’s integrated business units include Concordia Behavioral Health, Concordia Group Health, Concordia Casualty and Concordia Ancillary. Concordia holds dual accreditations from the Accreditation Association for Ambulatory Healthcare Inc. (AAAHC) and the National Committee for Quality Assurance (NCQA). Visit www.concordiacare.com.

A&E firm Bergmann rolls out new brand identity
Bergmann has unveiled a new brand identity that focuses on strong local connections while also unifying the firm’s national identity with a single, new modern look and feel. The architecture and engineering firm has adopted a refreshed logo with updated colors, blue and black, which represent a departure from the years of red/maroon that had been associated with the company brand. Founded in Rochester in 1980 with just seven professionals, Bergmann has grown over the past four decades into a national company with more than 400 professional and technical staff across 12 offices. Bergmann’s continuous growth and expansion made this the right time for the firm to revamp its brand identity. For more information, visit www.bergmannpc.com.
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For more information, contact Brenda Shaver at (800) 848-APWA or send e-mail to bshaver@apwa.net.

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**INDEX OF ADVERTISERS**

<table>
<thead>
<tr>
<th>Company Name</th>
<th>Pages</th>
<th>Website</th>
</tr>
</thead>
<tbody>
<tr>
<td>Advance Metalworking Co., Inc.</td>
<td>66</td>
<td><a href="http://www.advancemetalworking.com">www.advancemetalworking.com</a></td>
</tr>
<tr>
<td>Bonnell Industries</td>
<td>67</td>
<td><a href="http://www.bonnell.com">www.bonnell.com</a></td>
</tr>
<tr>
<td>Camosy Construction</td>
<td>66</td>
<td><a href="http://www.camosy.com">www.camosy.com</a></td>
</tr>
<tr>
<td>CFA Software</td>
<td>66</td>
<td><a href="http://www.cfasoftware.com">www.cfasoftware.com</a></td>
</tr>
<tr>
<td>Construction Accessories, Inc.</td>
<td>66</td>
<td><a href="http://www.constructionaccessories.com">www.constructionaccessories.com</a></td>
</tr>
<tr>
<td>Easi-Set Buildings</td>
<td>67</td>
<td><a href="http://www.easisetbuildings.com">www.easisetbuildings.com</a></td>
</tr>
<tr>
<td>EnviroTech Services</td>
<td>66</td>
<td>www/envirotechservices.com</td>
</tr>
<tr>
<td>GVM Snow Equipment</td>
<td>66</td>
<td><a href="http://www.gvminc.com">www.gvminc.com</a></td>
</tr>
<tr>
<td>KM International</td>
<td>49</td>
<td><a href="http://www.kminternational.com">www.kminternational.com</a></td>
</tr>
<tr>
<td>MRL Equipment Company</td>
<td>67</td>
<td><a href="http://www.markritelines.com">www.markritelines.com</a></td>
</tr>
<tr>
<td>Precision Concrete Cutting</td>
<td>66</td>
<td><a href="http://www.SafeSidewalks.com">www.SafeSidewalks.com</a></td>
</tr>
<tr>
<td>RHOMAR Industries</td>
<td>31</td>
<td><a href="http://www.rhomar.com">www.rhomar.com</a></td>
</tr>
<tr>
<td>Roll-Rite LLC</td>
<td>67</td>
<td><a href="http://www.rollrite.com">www.rollrite.com</a></td>
</tr>
<tr>
<td>Track Star International Inc.</td>
<td>67</td>
<td><a href="http://www.trackstar.com">www.trackstar.com</a></td>
</tr>
<tr>
<td>Transpo Industries</td>
<td>66</td>
<td><a href="http://www.transpo.com">www.transpo.com</a></td>
</tr>
</tbody>
</table>

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