United States Public Health Service

MACHINATORES VITAE

Engineer Community Newsletter

INSIDE THIS ISSUE:

From the Chief Engineer Officer

Edward M. Dieser, P.E.
Rear Admiral, US Public Health Service
Assistant Surgeon General

Fall 2018

Happy Fall and Football Season!

Recently, IHS and FDA hosted me for engineer all-hands. I thank CAPT Sean Boyd and LCDR Courtney Drevo for pulling off the White Oak impromptu session in less than 24 hours. I also thank CAPT Harvey and all the engineers at IHS for their hospitality and making a category wide call possible – again on relatively short notice. I hope to host similar sessions by phone and with other agencies over the remainder of my tenure to update you on the evolution of the Corps, our operations, and future opportunities. Thanks to all who participated in these events.

A few quick operational items: Please verify your readiness status and check your promotion eligibility. Recently, engineers led all other categories in readiness status. Our rate continues to hover between 90-95% - let's try to eclipse 98% by the end of the calendar year. Regarding promotion, the 2019 Benchmarks include several minor, though important changes. Time lines for your COER and ROS will shift with updates from Headquarters – be watchful.

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It is also a good time to review and update your CV – I will be joining you on these tasks. Both are key to seizing unexpected opportunities.

As a closing, I am including an excerpt from my CDC promotion ceremony keynote:

Why do we promote officers? How did you get promoted? Think about that just a few seconds.

I ask officers that question. Of course one responded "because the board selected me sir." There is always a wise one. So, why did the board select you? Because of all the great things you have achieved, the great program you managed, the great impact you had?

The US Public Health Service, the federal government, and the nation, have NO fiduciary interest in promoting you because of things you have accomplished in the past. You are not promoted as a reward for past deeds. We give $1.50 ribbons as awards for the past.

You are promoted solely to give you more work. The board reviewed your record, all those past accomplishments, and deemed you ready for more responsibilities. Prepared to engage the challenges at the next grade, to supervise and lead more people, to take more risks. Promotion is all about the future.

If you think you have reached the "promised land" through this promotion – particularly to Captain – you are in the wrong profession. This is true for all officers, if you think you can just relax, stop striving to improve, stop seeking responsibility and advancement – regardless of rank; you are in the wrong clothes.

Do more, Seek more, Lead more --- that is why you are being promoted today!

I look forward to visiting with many more of you soon.

Machinatores Vitae – Paratus, Volens, Peritus

RADM Edward M. Dieser, P.E.

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If you have any questions or comments related to the Engineering Category or EPAC activities, feel free to contact any of the following EPAC members.

EPAC	Point of Contact	Agency	e-mail
Chair	CAPT David Harvey	IHS	David.Harvey@ihs.gov
Subcommittees			
Rules/Recruitment (Chair)	CDR Samuel Russel	EPA	Russell.Sam@epa.gov
Recruitment (Vice Chair)	LCDR Praveen K.C.	EPA	KC.Praveen@epa.gov
Awards (Chair)	LCDR Abbas Bandukwala	FDA	Abbas.Bandukwala@fda.hhs.gov
Awards (Vice Chair)	CDR John Kathol	IHS	John.Kathol@ihs.gov
Career Development (Chair)	CDR Bradley Cunningham	FDA	Bradley.Cunningham@fda.hhs.gov
Career Development (Vice Chair)	LCDR Samantha Spindel	FDA	Samantha.Spindel@fda.hhs.gov
Career Development (Mentoring Lead)	LCDR Peter Littlehat	IHS	Peter.Littlehat@ihs.gov
Events (Chair)	LCDR Diana Wong	CMS	Diana.Wong@cms.hhs.gov
Events (Vice Chair)	LT Derrick Buck	LT	Derrick.Buck@ihs.gov
Information (Chair)	CDR Joshua Simms	FDA	Joshua.Simms@fda.hhs.gov
Information (Vice Chair)	LCDR Theresa Grant	CDC	TAGrant@cdc.gov
Public Health Engineering Practice (Chair)	LCDR Julia Kane	NPS	Julia_Kane@nps.gov
Public Health Engineering Practice (Vice Chair)	CDR Deborah Hirst	CDC	gpo0@cdc.gov
Readiness (Chair)	CDR Frank Chua	IHS	Francis.Chua@ihs.gov
Readiness (Vice Chair)	LCDR Shane Deckert	IHS	Shane.Deckert@ihs.gov
Executive Secretary	CDR Leo Angelo Gumapas	NIH	LeoAngelo.Gumapas@nih.gov
Executive Treasurer	LCDR Matthew Hunt	NIH	Matthew.Hunt@nih.gov
Special Assignment: Engineer Impact Measure	LCDR Matthew Palo	FDA	Matthew.Palo@fda.hhs.gov
Special Assignment: Engineer Impact Measure	LCDR Jitendra Virani	FDA	Jitendra.Virani@fda.hhs.gov
EPAC Website			https://dcp.psc.gov/osg/engineer/

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2018 EPAC Chair Update

CAPT David Harvey, PE, MPH

EPAC Having an Impact

As I write this newsletter it is the end of August with still four months left in the calendar year. In this short period of time, the Engineer Professional Advisory Committee (EPAC) has already contributed to the support and advocacy of the Engineer Category in a number of ways.

Chief Engineer Award Ceremony

The **Awards Subcommittee** did a tremendous job advertising, collecting, and evaluating award nominees. Key to the success of the awards ceremony, held in February 2018 in Rockville, MD, were the organization and logistical skills provided by the **Events Subcommittee**. Additionally, this year was not just another routine EPAC Awards Ceremony; it required planning and coordination of the Change of Command Ceremony for the Chief Engineer.

USPHS Scientific & Training Symposium

Engineer Category Day, organized by the **Events Subcommittee** at this year's Symposium, drew 74 attendees, the most since 2008. There were 11 presentations that highlighted the work and achievements of engineers working in the Food and Drug Administration (FDA), Environmental Protection Agency (EPA), Indian Health Service (IHS) and National Park Service (NPS). Additionally, the **Career Development Subcommittee** organized a well-attended "speed dating" mentoring session that provided an excellent opportunity for career-enriching information exchange.

Call to Active Duty Assistance

The **Recruitment and Retention Subcommittee** is continuing to support the onboarding of engineer candidates into the Commissioned Corps. Thirty-eight candidates from the April 2018 open window voluntarily sought support from

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EPAC and were matched with 17 current engineer category members to assist them through the onboarding process. The Recruitment and Retention Subcommittee is also coordinating category volunteers to staff appointment boards and routinely provides recommendations on improving the onboarding process to the Chief Engineer.

Readiness

The **Readiness Subcommittee** is developing summary documents that describe the capabilities of the engineer category members during deployments. EPAC will utilize this information to highlight the value and importance of deploying engineers to senior leaders in the Department of Health and Human Services, the Assistant Secretary for Preparedness and Response, the Commissioned Corps and other external partner agencies. The Readiness Subcommittee also facilitated a deployment handoff discussion between engineer category members deployed to assist the Puerto Rico Department of Health. This included information on how to prepare detailed cost estimates for work to repair, replace and/or mitigate hazards at over 50 critical medical facilities damaged during Hurricane Maria.

Communications

The **Information Subcommittee** has been actively working with other EPAC Subcommittees to ensure the materials on the EPAC website are accurate and up to date. The Information Subcommittee also has solicited articles, edited, and published two EPAC newsletters. Additionally, the **EPAC Executive Secretary** coordinated category representatives from the IHS, EPA, FDA and Center for Disease Control and Prevention (CDC) to provide presentations during general EPAC meetings to highlight the roles of engineers at their respective agencies.

Esprit de Corps

The **EPAC Executive Committee** has been leading the design and procurement of a new Engineer Category Coin and uniform regulation hardhats that promote esprit de corps within the category.

The need has never been a greater to elevate and highlight the importance of engineers in protecting, promoting and advancing the health and safety of our Nation. If you are looking for a way to support the Engineer Category in this endeavor, consider joining an EPAC Subcommittee by reaching out to the Subcommittee Chair. Membership is open to all Civil Service and Commissioned Corps engineers in HHS offices and agencies, as well as Commissioned Corps Officers detailed to outside agencies.

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Puerto Rico Medical Facilities – Long Term Recovery Ops

CAPT David Mazorra, and CDR's Kris Neset, Tanya Davis, and Michael Termont

Introduction

Puerto Rico's critical infrastructure was severely damaged after Hurricane Irma skirted the island on September 7, 2017, and then Hurricane Maria made a direct hit on the island on September 20, 2017. Maria left Puerto Rico's 3.7 million residents without electricity - making headlines across the country (FEMA, 2018). Critical health infrastructure was in a stressed state before Hurricane Maria's 155 miles per hour winds (Category 4) and heavy rains hit Puerto Rico. Public Health Service (PHS) engineers have supported relief efforts with site assessments, cost estimates, planning, design, construction, operation and maintenance for various types of infrastructure that includes drinking water, wastewater, solid waste, roads, electrical utilities, and health care facilities. This article highlights the work of three teams of PHS engineers who were deployed to assist the Puerto Rico Department of Health (PRDOH) with Federal Emergency Management Agency (FEMA) Public Assistance (PA) Grant Program applications for 58 critical health care facilities located throughout the island.

April 5, 2018 – Laboratorio Mayaguez – peeled back water proofing material on rooftop creating issues throughout the floors below

Mission & Questions

On March 22, 2018, the first PHS Engineer Team was deployed to assist with the Hurricane Maria Health and Social Services (HSS) Sector Recovery Support Function (RSF). The team was comprised of four professional engineers specifi-

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cally selected from the Indian Health Service (IHS) Division of Sanitation Facilities Construction (DSFC) and detailed to the Puerto Rico Department of Health to assist with FEMA PA applications under Category E (Buildings and Equipment). The mission conveyed by CAPT Miguel Cruz was clear: develop detailed cost estimates for the replacement or repair of 58 PRDOH critical health facilities by May 18, 2018. A list was provided to the team that ranked the facilities in categories 1 to 9, with 1 being the highest priority. However, key questions remained, such as:

1. What information was required for the FEMA PA program?
2. What cost basis was going to be used?
3. How were facilities going to be assessed?

Background & Solutions

1. At the time of the 2017 Hurricane Season, FEMA was working on a revised delivery model for the PA Grant Program (FEMA, 2018). FEMA leadership expedited launch of a new PA delivery model on September 12, 2017, but it was soon determined that Puerto Rico did not have the capacity to implement this approach. On October 30, 2017, the Commonwealth of Puerto Rico elected to use alternative procedures for all PA funding for permanent work (FEMA, 2018). However, there were no alternative procedure guidelines in place when the team of PHS engineers was first deployed in late March. As a result, the teams utilized the FEMA Public Assistance Program and Policy Guide to develop a PRDOH-approved report format; specifically merging the IHS DSFC Preliminary Engineering Report template with the Temporary Repair Report template from the US Army Corps of Engineers (USACE). The engineering report included detailed cost estimates for repair work, replacement work, applicable mitigation measures (to help withstand future storms/hurricanes), and restoration of facilities to their pre-disaster design (function and capacity) for FEMA Category E facilities. In addition, numerous on-site pictures were added to each report to document the issues and justify the repair or replacement costs.

2. Step two was to determine a cost basis. Upon arrival at FEMA's JFO (Joint Field Office) it was noted that FEMA's transportation sector was using RSMeans estimating software. FEMA HSS RSF (Health & Social Service Recovery Support Function) would be doing the FEMA cost estimates for the same PRDOH facilities as our engineer team. They were still working on temporary work and had not yet started permanent work; however, they had indicated that they would be using RSMeans once they started permanent cost estimates. RSMeans data is one of North America's leading suppliers of construction cost estimating information and includes a comprehensive database of itemized costs (for pile caps, foundations, structural steel, plumbing, HVAC, electrical, ADA-compliant facilities, etc.).

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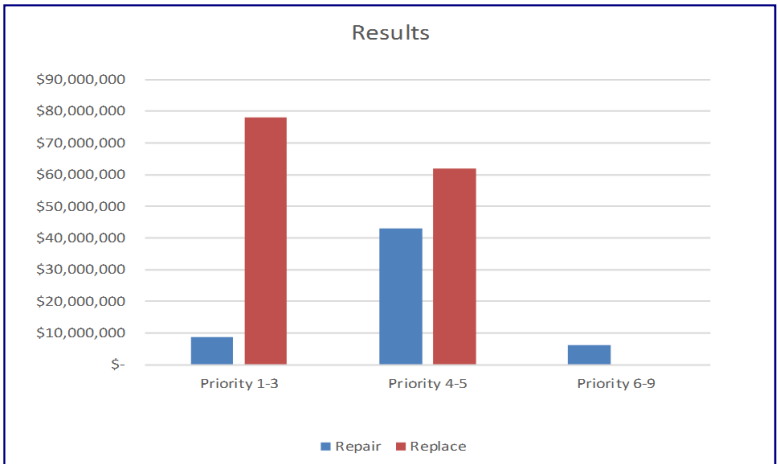
RSMeans data includes costs for Puerto Rico, specifically the locality of the capital city of San Juan. Engineer Team 1 quickly put together a proposal to purchase RSMeans and submitted it to leadership. Until the purchase could be approved, team members were able to temporarily use accounts from their permanent IHS duty stations.

3. Step three was to determine how facilities would be assessed. It was quickly determined that two teams of two engineers would be most effective and could alternate work in the field to do assessments one day and report writing back at the office the next day. It was not always possible to be accompanied by a PRDOH representative. Having a Spanish-speaking team member was helpful, but it was not critical. Teams would meet onsite and take notes, measurements, and pictures, and determine if any Temporary Repair work was completed or pending. One challenge teams faced was differentiating between impacts that were pre-hurricane, and impacts that were attributable to Hurricane Maria. (Some facilities had maintenance issues, were being utilized beyond their original design intent, and/or were beyond their design life prior to the hurricane.) Cost estimates were based on information gathered from site visits, and input from PRDOH on the condition of facilities before Hurricane Maria. However, in some situations it was noted in the cost estimate report that addressing pre-existing issues was necessary to mitigate the impacts from future storms or hurricanes.

FEMA uses "The 50% Rule," comparing repair costs to 50 percent of replacement costs to determine whether to proceed with a repair or replacement. For repair costs, individual line items for repairs were estimated using RSMeans. For replacement costs, a tool within RSMeans to estimate building costs based on square footage was used. Google Earth Pro was used to determine the footprint of the facilities. Other data sources included USACE Temporary Repair Reports on some health facilities, FEMA Flood Maps, auxiliary reports, and health assessment forms. Common focus areas included damage to roofs, doors, windows, drainage, and



Results Table Showing Total Costs to Repair or Replace

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heating, ventilation and air conditioning (HVAC) systems, as well as mold abatement. However, each health facility located throughout Puerto Rico was unique and posed its own challenges and opportunities for permanent improvements.

April 11, 2018 – Centro Pediatrico Mayaguez – displaced A/C units on rooftop; this was a common issue

Conclusion

PHS Engineers developed cost estimates and reports for 58 PRDOH critical health care facilities. The total cost to repair and replace critical health care facilities is an estimated $200 million dollars (not including land acquisition and geotechnical work that may be required). Replacement was recommended for eight facilities, and represented a significant portion of estimated costs compared to estimated repair costs that were primarily related to HVAC and roof damage.

PHS Engineers were well-suited for this mission as it required problem solving, attention to detail, project management skills, and the ability to work with a variety of key players to move the mission forward. With a rotation of three engineer teams along with the steady guidance and leadership of CAPT Miguel Cruz (who is stationed in Puerto Rico long-term and whose local knowledge was extremely valuable), the mission was successfully completed by the deadline of May 18, 2018.

Team Lead	CAPT Miguel Cruz	Team 2	CDR James Kohler
Team 1	CAPT David Mazorra	Team 2	LCDR Deborah Cox
Team 1	CDR Tanya Davis	Team 3	CDR Sean Bush
Team 1	CDR Kris Neset	Team 3	CDR Christen Glime
Team 1	CDR Michael Termont	Team 3	CDR Steven Scherling
Team 2	CAPT Kelly Hudson	Team 3	LCDR Julia Kane
Team 2	CDR Gregory Ault		

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Big Picture & Future Missions

The role of engineers in all phases of disaster response deserves consideration for future missions, as our technical expertise can make the difference in expediting the recovery of critical systems. During and after the 2017 hurricane season, PHS Engineers contributed to the restoration of public health and medical services. Engineers have proven to be a key resource in disaster recovery and can be utilized in a variety of ways (more than just Logistics). PHS Engineers should prepare for similar disaster recovery missions in the future to ensure that deployment teams are set up with the necessary tools to conduct this work (e.g. measurement devices, software, field gear, personal protective equipment, etc.). As USPHS Engineers, expect similar disaster recovery missions in the future.

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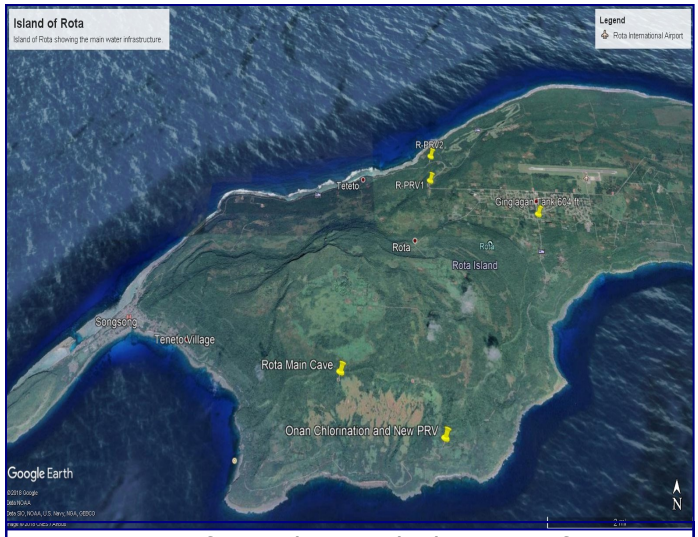
Engineering on the Island of Rota

LCDR Travis Spaeth

The U.S. Territory of the Commonwealth of the Northern Mariana Islands (CNMI) is located in the western Pacific Ocean and includes the three inhabited islands of Saipan, Rota and Tinian. I currently work for the Commonwealth Utilities Corporation (CUC) in Saipan on an assignment through the U.S. Environmental Protection Agency (USEPA) to help provide safe drinking water and wastewater services throughout the territory. I am responsible for multiple water and wastewater projects on Saipan. I also provide engineering services for the entire water system of Rota, which has a population of approximately 2,500 people and a total area of 33 square miles.



Map of Rota showing the locations of water system infrastructure

Rota has a very unique water system, as its main source of water consists of a cave located nearly 1,000 feet above sea level. The cave supplies a distribution network that included a 500,000-gallon tank in the village of Sinapalo. During my initial assessment of the system, I was surprised to find that the tank continuously overflowed at a rate of 50-250 gallons per minute. Through

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field analysis, pressure readings, as-built reviews, and system manipulation, I was able to identify the cause of the tank overflow and develop a plan to reduce losses and improve overall service.

LCDR Spaeth with employees of the Rota CUC

I found that the elevation of the tank was not adequate to serve all the communities on the distribution system. An elevated tank would have improved system performance, but would also be vulnerable to environmental hazards such as earthquakes and typhoons. As designed, the tank basically functioned as an oversized pressure reducing valve (PRV). Due to the high elevation of the cave, we were not able to isolate the tank without causing excessive pressures throughout the system. Luckily a project was funded to make water system improvements such as new valves, a new booster station and upgrades to wells to back up the water supply during drought conditions. I decided that our top priority was to add a new PRV to the system so we could eliminate the overflow at the tank. I also began to question the need for the proposed booster station since the system already had excess pressure from the cave source. I soon realized the booster station would not be necessary to install, but a project was already funded and out to bid for installation of a new triplex booster station designed prior to my arrival.

I was able to order a new PRV and flew down to Rota (in a 6-seater plane) to assist the CUC staff with the new installation (keep in mind that getting materials to the islands can take 3-6 months in some cases, especially to Rota). The PRV allowed us to instantly eliminate the overflowing tank, saving millions of gallons of water and improving service reliability to the communities. I also worked with the chief engineer at CUC to cancel the proposed booster station. I have since been working on a new tank site to provide proper pressure to all the higher homes in Sinapalo, eliminating the need for pumping for the entire island. We expect that Rota will be a very efficient water system consuming zero power in the near future.

This project illustrates one of the many important roles that PHS engineers play in improving the public health infrastructure of the CNMI. Remote islands present unique and exciting opportunities to evaluate systems, engineer solutions, and lead projects that have lasting and meaningful impacts on underserved communities.

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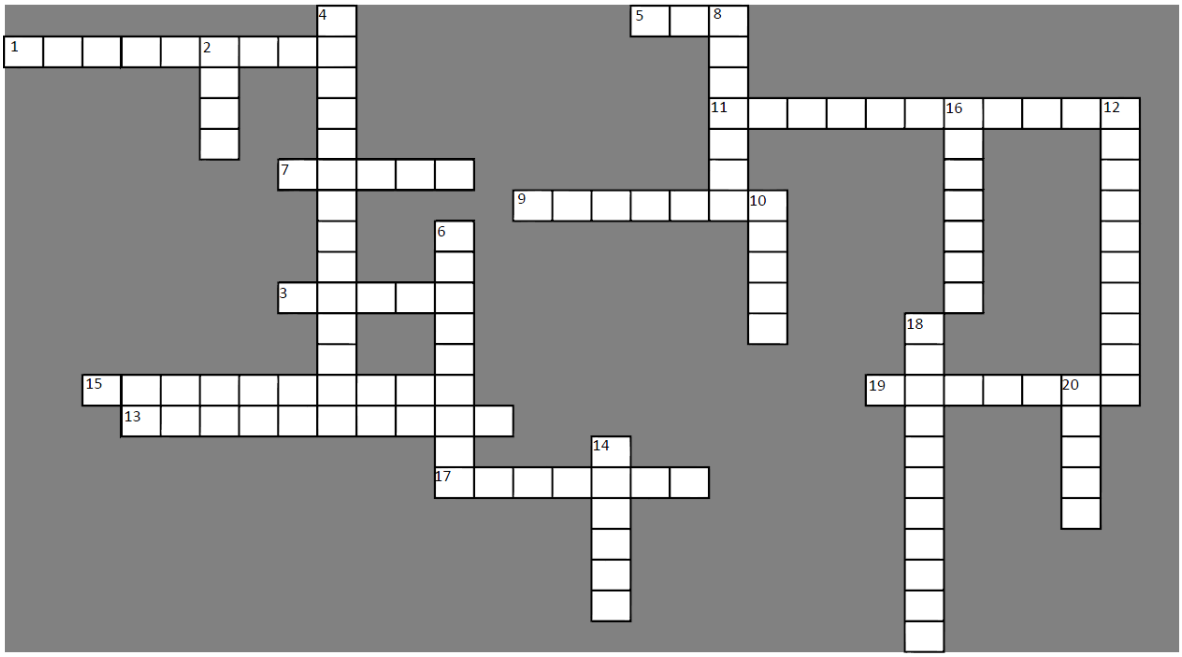
Crossword Puzzle



ACROSS

1. Properties that are independent of mass in a system
3. Swiss mathematician that popularized the mathematical constant *"e"*
5. Gold _____ leaf is the insignia worn by an O4
7. One type of valve used to regulate flow in a piping system
9. The study of forces on rigid bodies at equilibrium
11. Surgeon General that authored the paper "Understanding AIDS" in 1986
13. One of the core values of the Commission Corps
15. Greek mathematician credited for the mathematical explanation of a lever
17. EPA has set a 10mg/l MCL for this anion in drinking water
19. Electrical principle relating voltage, current and resistance

DOWN

2. Imperial Unit of Mass
4. Ratio of inertial forces to viscous forces
6. Coordinate system base on two or three mutually perpendicular axes.
8. Energy possessed in a system as a result of it's motion
10. Forces that act tangent to a cross section
12. Scientific law used to explain equal pressure exerted in all directions of an incompressible fluid
14. A gesture of respect rendered with the right hand with the right hand while in uniform and covered
16. Concrete has a very low _____ strength
18. First Chief Engineer for the USPHS Commissioned Corps
20. This President signed into law the Act that gradually led to the creation of the USPHS Commissioned Corps

(Crossword solutions appear on page 13.)

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New Engineer Officers

The EPAC would like to acknowledge the following engineers who have recently become Commissioned Officers. The EPAC welcomes each of you and hopes you will enjoy a long and prosperous career in the PHS.

Rank	Name	OPDIV	City	State
LT	Shaun Stracener	FDA	Omaha	NE
LT	Jong Won	FDA	Silver Spring	MD
LT	Keeshan Williams	FDA	Jamaica	NY
LT	Brian Julius	IHS	Pierre	SD
LT	Matthew Chadwick	IHS	Fort Duchesne	UT
LT	Sandra Miller	ATSDR	Atlanta	GA

Fair Winds and Following Seas

The EPAC would also like to recognize the engineer officers who have recently retired from the Commissioned Corps. The EPAC sincerely appreciates your leadership and dedication to the mission of PHS engineers.

Rank	Name	OPDIV
CAPT	Patrick Stewart	IHS
CAPT	Steven Raynor	IHS
CAPT	Hubert Cathlin	DOD/ TMA
CAPT	Frank Behan	EPA
CDR	William Robberson	EPA
CDR	Kurt Sauers	IHS
CAPT	Michael Koehmstedt	IHS

Crossword Solutions:
Across: 1. Intensive, 3. Euler, 5. Oak, 7. Globe, 9. Statics, 11. Everettkoop, 13. Leadership, 15. Archimedes, 17. Nitrate, 19. Ohmslaw
Down: 2. Slug, 4. Reynoldsnumber, 6. Cartesian, 8. Kinetic, 10. Shear, 12. Pascalslaw, 14. Salute, 16. Tensile, 18. Johnhopkins, 20. Adams

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Dear Readers,

Machinatores Vitae (Engineering for Life) is a publication of the EPAC, but we need help in bringing you the information and stories that you want to read. Please consider submitting an article for an upcoming issue or let us know when you or a colleague have reached a milestone, been recognized for an accomplishment, or have an experience to share. If you are an accomplished writer, send something along that is already polished. If you don't feel like a Hemingway or Dickinson, just send enough detail so the writing team can take hold of it and build the story for you.

The writing staff can only see a bit of the big world that is public health engineering. There are numerous accomplishments even within our readership that remain unknown except in the relatively small circles around you. If you have not presented at a national meeting, the likelihood is that no one outside of your agency, or possibly even Office, ever heard about the project that you nearly exhausted yourself completing. Here is your chance to shine!

All ideas are welcomed. Remember that we do not have to solely focus on work going on within the PHS. Let us know if you hear of new technologies or applications, or just find an interesting story from the outside world. The rule of thumb is that if you as an engineer are interested in it, then others will be too!

Send your thoughts, suggestions, or a brief synopsis of a proposed article to the newsletter coordinator, LCDR Jason Petersen at Jason.Petersen@ihs.gov.

Thank you,

The Newsletter Team
EPAC Information Subcommittee

Machinatores Vitae is published twice annually and posted on the USPHS Engineer Professional Advisory Committee website. The deadline for submitting articles for the **Spring 2019** edition is **February 28, 2019.**