A QUARTERLY UPDATE FROM THE SOCIETY OF AFGHAN ENGINEERS

SAE eNEWSLETTER

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Dear Colleagues:

On behalf of the Editorial Board of the SAE eNewsletter I wish you and your respected families a Happy 1395 Afghan New Year. We are looking forward to the prosperity and peace in Afghanistan and the entire world.

It is a pleasure to provide you the second issue of the 2016 SAE eNewsletter (newsletter). This is the sixth year of the quarterly update from the Society of Afghan Engineers (SAE).

This issue of the SAE eNewsletter (newsletter) features a report about the SAE Seminar and General Assembly meeting, which was held on January 16, 2016.

There are articles by Ustad Hafiz Wardak, entitled, Unique Opportunity for Afghan Engineering Professionals and by Dr. M. S. Keshawarz about Standard Precipitation Index (SPI), A Drought Index for Afghanistan.

The newsletter includes an interview with E. Bruce Barrett, RA, Vice President of Architecture and Engineering at New York City School Construction Authority.

We are looking forward to the receipt of your technical news, articles, comments, suggestions, questions, and opinions about SAE and this publication.

Very Truly Yours,

G. Mujtaba, MS- CE, P.E., CPM;
Editor- In- Chief, SAE eNewsletter

"The newsletter includes an interview with E. Bruce Barrett, Vice President of Architecture and Engineering at New York City School Construction Authority."

INSIDE THIS ISSUE

GREETINGS FROM THE SAE PRESIDENT

Dear SAE Colleagues Salaam:

I wish everyone a Happy New Year 1395.

I want us all to celebrate this year by inviting all members to continue our successes and become actively involved with the Society.

My second year in the office began with hosting the Society's annual General Assembly Meeting (GAM) combined with a Seminar on Kabul Traffic Problems, Challenges and Solutions. Unlike past years, the Executive Committee together with the full support of the Board of Directors, held the GAM/Seminar in person at George Mason University, in Fairfax, Virginia. Also, some members attended the meeting by video and teleconference.

The gathering was well-attended with the room at full capacity. The members of the Society of Afghan Engineer (SAE) from the United States, Canada, Europe and Afghanistan as well as local Afghan community leaders and members of other Afghan organizations actively participated at this seminar. The newly appointed Afghanistan Ambassador to Washington H.E. Dr. Hamdullah Mohib participated at the seminar for the first time since his arrival in Washington and was the keynote speaker. A brief report of the GAM/Seminar will be provided separately in this issue of the newsletter.

The Executive Committee has been meeting regularly to discuss issues of interest. Several official meetings were held with Afghan Government officials, starting with an introductory meeting with Ambassador Mohib who himself is an engineer and joined as a member of the Society.

Another meeting was held with Afghanistan's Chief Advisor to the Afghanistan President and the Coordinator for Infrastructure, Human Capital and Technology, Dr. Hamayoun Qayoumi. Dr. Qayoumi is the former President of San Jose State University, California and a long-time supporter of the Society of Afghan Engineers. The discussion with Dr. Qayoumi was lively, candid and productive. The SAE members present at this meeting voiced their concerns and discussed issues of mutual interest. Dr. Qayoumi expressed his desire to work directly with SAE and seek the Society's assistance and involvement in all aspects of Afghanistan's development projects.

As I have previously stated, the government of Afghanistan and now Dr. Qayoumi has given SAE an open invitation to fully participate and contribute to Afghanistan's development and construction efforts. This is our opportunity to prove that SAE is indeed a professional, experienced, and effective organization. Once again, I am calling on all members to be involved in the SAE activities at whatever level or capacity you can.

On behalf of the Executive Committee and the Board of Directors, I invite you to participate in this tremendous opportunity to help rebuild Afghanistan by applying your specific expertise in any areas of architecture and engineering fields. But, we need to build SAE's capacity first. In

order to assess our resources and capabilities for coordinating with the relevant ministries in Afghanistan, we need updated contact information from each of you. We hope you will join in this extraordinary endeavor by first providing us the following information:

- Full Name:
- Email Address:
- Education level:
- Years of experience in the areas of expertise:
- Current Employer:
- Mailing Address (optional):

Many of SAE members have already responded to my earlier request for information, I thank them for their quick responses and their support of SAE activities. We would only be able to help, when we have the support of our members and their active involvements.

Also, the Society has several committees with open vacancies. I call on all members to select a committee of your choice and become active in the day to day operation of the organization. I sincerely thank you for your willingness to participate in SAE activities and be part of developmental efforts for our beloved Afghanistan.

Sincerely,

Atiq Panjshiri

President, Society of Afghan Engineers (SAE)

A NEW YEAR MESSAGE From

Sohaila Shekib, Chairperson, SAE Board of Directors

As we bid goodbye to winter season and welcome the spring season, I would like to take this opportunity to wish Happy New Year 1395 to each and every respected family living outside of our homeland, and in particular those who reside in Afghanistan. It is my prayer to Allah (swt) to grant us peace, health, prosperity and joy. I hope this Nowruz will be a blessing to our country to progress towards a better and more secure environment for a safe lifestyle, especially for our Afghan sisters, brothers and children who live inside Afghanistan and endure a lot of problems.

I would like to congratulate the Executive Committee Members and the Board for the excellent work in organizing the SAE Annual Conference/Seminar which was a great success.

I extend my appreciation to our colleagues who participated in the conference from long-distance inside and outside of the United States. The topics presented by experienced colleagues were informative and well-fitting for solutions in the reconstruction problems facing Afghanistan today.

It is our duty and obligation to ensure that similar conferences are organized to advance our goals of contributing to the reconstruction of our beloved country.

Very truly yours,

Sohaila Sanie Shekib,
Chairperson, Board of Directors
The Society of Afghan Engineers

Comments and Suggestions

Mr. Don Quilio's comment:

We have received a comment regarding the SAE eNewsletter from Mr. Don Quilio, P.E., former District 2 Construction Materials Engineer of Florida Department of Transportation (FDOT) and Editor-in- Chief's colleague, former supervisor, and friend. It is an honor to receive an email

from a respected (FDOT) professional engineer regarding the January 2016 issue of the newsletter. In his email he has written "I enjoyed reading the SAE eNewsletter".

Response to Mr. Quilio's comment:

Don,

I am pleased to know that you have enjoyed reading the newsletter. Thanks for the comment. In case if you have any technical article, please send it and it will be included in one of the upcoming issues of the newsletter. The readers of the newsletter will benefit from your knowledge, experience, and expertise.

Best regards,

Ghulam Mujtaba

SAE General Assembly Meeting/Seminar report

Location: George Mason University, Fairfax, VA Date: January 11, 2016

To break away from past practice of hosting the General Assembly Meeting (GAM) via teleconference, the Executive Committee and the Board of Directors collectively decided to hold this year's meeting in person. Proper preparation and arrangements led to the event being very successful. Invitations were sent out to all SAE members as well as other non-profit organizations. The event was well-attended with the conference space being filled to max capacity.

In addition to the regular GAM, a seminar to discuss issues of interest to both SAE and the Government of Afghanistan was added. The GAM and seminar culminated in a whole day event from 9am – 5pm. The meeting was formatted as presentations followed by a panel discussion of experts on traffic problems currently facing Kabul. The early part of the program from 9am - 10am was allocated for breakfast, registration, and networking.

The program officially started with recitation of verses from the Holy Quran by Eng. Idrees Ahmad Noori. SAE President Eng. Atiq Panjshiri welcomed the participants and gave his opening remarks on activities of the Society in 2015. SAE's Chairperson of the Board, Eng. Sohaila Shekib, presented her appreciation and opening remarks on behalf of the Board of Directors.

Afghanistan's Ambassador to Washington, H.E. Dr. Hamdullah Mohib, had graciously accepted SAE's invitation to serve as the keynote speaker, his first professional appearance since starting his ambassadorship. His keynote speech focused mostly on the need for SAE members to

become actively engaged in Afghanistan's development. He stressed the fact that Afghanistan needs our experience and expertise and that as an engineer himself and a representative of the Government of Afghanistan, he would do his best to facilitate SAE becoming involved in any relevant project we choose.

Following Ambassador Mohib's speech, the seminar officially started. To open the discussion SAE President Eng. Atiq Panjshiri started this session with a presentation describing Kabul Traffic Problems, Challenges and Solutions. The presentation focused mainly on traffic issues, geometric design challenges, and drainage problems.

SAE Board of Directors member, Eng. Amanullah Mommandi, provided an excellent presentation on highway drainage issues, difficulties, and recommended solutions by comparing existing Kabul city drainage problems to Denver, Colorado where he has been working for the past 30 years. The solutions he provided to alleviate the current drainage a problem of Kabul City was well received by the audience.

SAE Board of Director's member, Eng. Nazeer Babacarkhail, tackled the other aspect of Kabul City Traffic problems from the geometric design stand point. He provided recommendations based on best practices as a way for Kabul City to solve its current problems. He also identified the major challenges in Kabul City to be: the tremendous increase in population, lack of sufficient roadway system to accommodate this population increase, lack of proper public transportation system, and street vendors and lack of public education. Eng. Babarcarkhail ended his presentation with providing his recommended short term and long term solutions.

The first part of the morning concluded with an hour long panel discussion on the above-mentioned topics as well as other issues of interest to participants. The panel discussion was lively and interesting. The audience was actively involved providing their own views and comments to the panelists. The panel discussion was so interesting that the participants willingly agreed to shorten the lunch break to continue with the debate.

A short lunch break was provided with authentic Afghan food. The afternoon session started with the same format of presentation followed by panel discussion as in the morning session.

The first presentation was by Eng. Abdullah Habibzai who traveled from Afghanistan and provided his research on Afghanistan Green Urban Transport Strategy.

SAE Board of Director's member Dr. Saleh Mohammad Keshwarz, then presented the Afghanistan's drought index. He explained the need for knowing and utilizing this index to anticipate and plan for drought situations in Afghanistan. He mentioned the unforgettable drought period in the late sixties in the south and north of the country was a dark period in the life of Afghanistan. The severe drought that face the country could have been prevented or at least drastically reduced its severity with proper planning with use of drought index.

SAE member from Canada's Chapter, Dr. Yar Mohammad Taraki, who spent several years on the development and publication of Afghanistan's Building and Road Codes, provided a detail description of the codes and required implementation process. He reiterated the need for educating not only the government employees to understand these codes for implementation and enforcement, but also the construction industry so they can effectively use them and be in compliance for their projects.

The last part of the seminar focused on natural disaster prevention, once again our colleague Eng. Amanullah Mommandi, who has over 30 years of hands-on experience in avalanche mitigation, provided a detail description of the early warning signs for avalanches and provided an excellent video presentation on more practical new methods for mitigating for avalanches to save lives.

The second half of presentations ended with a panel discussion on these topics and the audience again was actively involved. The discussion was very interesting but due to time constraints, the moderator was forced to cut the discussion short.

After the seminar, matters of annual reporting for the Society were discussed with the members. SAE's Treasurer, Architect Ashraf Roshan, presented SAE's financial report for 2015. Then SAE President provided his closing remarks by thanking the participants and announcing that next year's GAM would be around the same time in January 2017. The meeting adjourned at 5pm.

The Society of Afghan Engineers sincerely appreciates all members and guest who were able to attend the meeting either in person or watched the conference via YOU TUBE.

A special thanks to our young volunteered engineers who donated their time and effort for months preparing for the conference.

We sincerely thank and appreciate the George Mason University for making the space available for this event and many thanks to our Afghan Student Union of GMU for their assistance securing the space for this event.

Video of the event will be posted on SAE website www.afghanengineers.org

Unique Opportunity for Afghan Engineering Professionals

By: Ustad Hafizullah Wardak

On December 13, 2015 presidents of four countries, Turkmenistan, Afghanistan, Pakistan and India (TAPI), attended construction ceremony of a major engineering project in the south central city of Mary, Turkmenistan. This is awesome news of great opportunities for the engineering

professionals in Afghanistan. The project which will be transporting natural gas from its production basins in Turkmenistan through Afghanistan to India and Pakistan could become a source of employment for various professionals in Afghanistan for an extended period of time. It is a unique opportunity for engineering professionals to participate and get involved in the design, construction, maintenance and operations of a mega project for many years to come. This is an economic infrastructure that has potential of creating thousands of jobs for all types of workers.

The higher engineering institutions in Afghanistan need to start plans for training and educating local engineers with special skills to support design, construction, maintenance and operation of this project. The Afghan educational institutions must get ready for this exceptional opportunity by making available anticipated needy skills as part of their regular academic curriculum.

Background:

The Turkmenistan, Afghanistan, Pakistan, and India (TAPI) natural gas transmission system consists of 1800 kilometers pipeline routing through several western provinces of Afghanistan. The primary function of the transmission system is to move huge amounts of natural gas from producing regions in Turkmenistan, to local natural utility delivery points in Afghanistan, Pakistan and India. There will be pressure booster stations, metering stations, city & country gate stations and storage facilities required along the way to boost pressure for maintaining continuous flow of the natural gas from point to point. Gas flow occurs from high pressure to low pressure location. The construction and maintenance of the system have to comply with agreed standards and regulations. In general operating pressure in the pipeline ranges from 200 to 1500 psi. The pipes used for transmission may vary in diameter and shapes; generally the diameter of pipeline varies from 50 to 100 cm. The pipeline could be aboveground or belowground depending on the topography and terrain of the transmission route. In either case there will be need for substantial engineering and construction work to design and build the required support structures. With the start of this project thousands of engineering jobs will be created to support construction, maintenance and operations for extended period. It will also create many jobs for construction, management, operation and maintenance type employees.

Pipeline Construction:

Prior to construction, the route of the transmission system has to be determined. Route building could involve substantial engineering and construction effort, where engineering survey, soil and foundation, hydrology, and structural engineering will play a major role in establishing the route. Soil capability for supporting the pipeline infrastructure need to be determined to minimize and avoid differential settlement beyond allowable that could introduce additional stresses in the pipeline welds and or parent material.

The pipe segments of various lengths need to be transported to the route site and then joined by special welding process to create continuous length. Pipes segments may be built in one or few locations, or in the producing basin country and transported to the route site. Pipelines, generally, are made from high strength steel; in some cases other materials can be used. The welding process could use automatic or manual procedure. All welds need to have non-destructive inspection (NDI) applicable method Radio Graphic (X-ray) or ultrasonic (UT). The pipes need to have external environmental protection coating to prevent corrosion.

Stresses in the Pipeline:

The pressure in the pipeline usually varies from 200 to 1500 psi, depending on the diameter and thickness of the pipeline, large stresses could occur in the parent material as well the welds and heat affected zones (HAZ). Any pipe, weld discontinuity and sharp radii could further magnify the internal state of stresses. There will be, in general two types of stresses, hoop (the stress in circumferential direction, PR/t) and longitudinal direction (PR/2t) where P is the internal pressure, R the radius, and t the thickness. Crack propagation occur normal to the principal stress, where crack initiation develop at the critical fatigue point. Since the pipeline system will

be passing through seismically active regions as well as harsh environmental condition such as, high wind, snow, thermal fluctuation, etc., the environmental impact should be understood and considered. This requires development of an operational load spectrum.

One area that will need special engineering effort is how to prevent crack initiation and unstable crack propagation in the pipeline system. Cracks could initiate due to corrosion, accidental damage, manufacturing defects, welding porosity, fitting stresses and operational fatigue as well as other causes. The allowable crack length which depends on the residual strength capability of the structure, material fracture toughness, and crack growth characteristic need to be assessed. Crack propagation analysis of the pipe system subject to operational fatigue spectrum needs to be performed and understood. Welding procedures and subsequent non-destructive examination (NDI) procedures, as well quality control guidelines have to be developed well in advance.

Any undetected cracks could release dangerousness gases and create environmental hazards to the surrounding land, and route, loss of life as well result economic shortfall.

Engineering institution needs to add, classes in the area of welding, quality control and basic understanding of fracture mechanics as well as pressurized structures.

Corrosion could occur that may lead to crack initiation and eventual leak or crack propagation that impact structural integrity of the transmission system reaching critical crack length and losing residual strength capability. Corrosion protection need to be applied to pipes, and checked at the construction site.

Once the pipeline installation is complete and it becomes operational it will have to be monitored 24 hours all around the year.

Fatigue Crack Growth Propagation Characteristic of Pipeline:

To insure structural integrity of the pipeline system, fatigue crack propagation due to pressure cycles and any additional loads have to be assessed. Fracture mechanics methodology is used to model crack propagation due to induced pressure cycles. The longitudinal crack propagation along the seam due to hoop stresses needs to be assessed.

Required Steps for Fatigue crack propagation assessment:

1. Develop Load Spectrum. This spectrum will include all induced loads from fabrication of pipe, transportation, installation and lifetime operational loading events.
2. Characterization of the crack growth properties of both parent and weld material.
3. Determination of the critical crack length for the given material, geometry and maximum life loading.
4. Selection of the crack model and initial induced flaw size. There are several crack propagation models such as the Paris Law that can be used to determine life of the pipe structure. The characterization of the initial flaw or rogue flaw and its shape has to be established. The

flaw profile will be in term of length and depth or length with aspect ratio. Once initial flaw characterization is established, critical flaw size can be determined from the residual strength capability.

One method used to estimate fatigue life for a given initial flaw profile is by using the Paris Law Method. This is a power law that describes the incremental crack growth as a function of the stress intensity factor. It has a general form of : da/dN = C delta K^n, where **a** is the depth of the surface flaw, **N** is the number of cycles, **da/dN** is incremental crack growth per cycles, **C** and **n** are material constants and **delta K** is the range of stress intensity. Integration of the equation will determine the life of the flaw to grow from initial depth to the final critical depth.

If the plasticity in the front of crack tip is small, then linear elastic fracture mechanics principal can be used, where the state of stress at the crack tip is defined by stress intensity **K**. If plasticity in front of crack tip becomes high, then the **J-**integral method can be employed. The stress intensity is defined: **K** =**Y** time **sigma** time **square root** of **pi a** (**K= Y**□□times square root of□□**a**), where Y is the beta function, sigma is stress and **a** is half of the crack length. In addition it will also be advised to assess Leak before burst condition to assure safety.

Conclusion:

The TAPI project is a monumental undertaking, a large engineering project, and welcoming news for the Afghan engineering professionals that will require qualified professionals during construction and then life operation and maintenance. It is also an opportunity for Afghan higher education institutions to train and make ready a cadre of qualified personals in various engineering fields. This project brings a splendid opportunity for Afghan workforce with a prospect of well-paying employment.

About the Author:

Mr. Hafizullah (Hafiz) Wardak is the former professor of Kabul University and serves as a current member of the Board of Directors of the Society of Afghan Engineers.

He has received his BS degree in Civil Engineering from the University of Hawaii, Honolulu Hawaii and MS degree in Civil (Structural) Engineering from Case Western Reserve University, Cleveland, Ohio. He has completed all required course work for PhD (Fracture Mechanics) at the University of Alabama, Huntsville, Alabama.

Professor Wardak has been working with Boeing Aerospace Company as Full Scale Fatigue Test Director and lead engineer for the past 29 years. He has also worked with Sargent & Lundy- Chicago, Illinois, for 6 years as senior engineer, member of the Structural Specialist Organization. He has worked on structural analysis of several nuclear power plants.

In Afghanistan he worked at the Civil Engineering Department, Faculty of Engineering of Kabul University, for six (6) years as professor of the civil

engineering department, and deputy-chairman of the Afghan Seismological Center

The SAE eNewsletter Interviews

In every issue of the SAE eNewsletter the readers may find an interview with successful Afghan Diasporas or other professionals who are currently serving as executives, managers, presidents, deans, professors, architects, engineers, and leaders.

You may ask our other professional leaders, scholars, company chief officers, and engineering pioneers if they would accept our request for interview. You may also interview them and we will be pleased to publish their articles and interviews.

In this issue of the newsletter there is an interview with Vice President of Architecture and Engineering at New York City School Construction Authority. The SAE eNewsletter Editorial Board would like to take this opportunity to thanks Vice President for taking the time from her busy schedule to have an interview with Mr. A. Manan Khalid, the SAE Editorial Board member.

An Interview with E. Bruce Barrett, RA, AIA, LEED AP (BD+C); Vice President of Architecture and Engineering at New York City School Construction Authority

By: A. Manan Khalid, P.E., LEED AP (BD+C)

With over 1,800 schools catering to 1.1 million students, New York City's school system is not only the largest school system in the United States; it also creates and maintains some of the most important civic institutions in New York City (NYC). To build new schools and maintain the existing stock of more than 1400 buildings housing the 1800 schools, in 1988, the New York City School Construction Authority (SCA) was created. It had a proposed budget of $13.5 billion for the five- year Capital Plan that started in 2015. As of February, 2016, the current Five-Year Capital Plan was increased specifically to allow for more new school seats, to a total of $14.9 billion.

School Construction Authority bids out around $2 billion worth of projects each year. And at any given time, there have been close to $1 billion dollars of projects in design.

Bruce Barrett, a registered architect, is the Vice President for Architecture & Engineering who manages the design process that produces new schools for a growing city and ensures that existing assets are maintained and adapted to serve students best. She has been an artist, a teacher and an architect, and now in inspiring leader dealing with challenges of designing and maintaining schools for a complex city.

During her tenure, almost 250 new school building projects, creating about 110,000 new seats have been designed and built. Also, about 5,835 individual capital improvement projects with a total investment value of over $11 billion have been designed and built.

In addition to the enormous responsibilities as the Vice President of a complex organization, she still manages to be actively involved in the design of new school buildings. She attends design review meetings, and almost every seminar and training that are held, alongside her subordinates. This surely sets the example of a good role model. She has been a strong proponent of green initiatives and has championed the design of the first Net Zero School in North Eastern United States, which opened to students in September of 2015. The details of the project may be viewed at the following web link:

http://www.som.com/projects/ps_62_the_kathleen_grimm_school_for_leadership_and_sustainability

With her overwhelmingly busy schedule, she gracefully accepted the SAE eNewsletter's invitation for an interview. It is a pleasure and an honor for me to interview her, and present the readers inside Afghanistan, and elsewhere in the world, to benefit from her insight, wisdom and experience.

The following are the interview question/comment (Q) and Vice President's response/discussion (A):

Q: It is a pleasure and an honor to get the opportunity to interview an artist, a teacher, an architect and a dear boss. Please briefly tell the readers about yourself, your education, hobbies and activities.

A: My formal education includes a Bachelors degree in Art (both Art History and Studio –mostly painting, drawing and printmaking), a Masters degree in Elementary Education (I have certification in Nursery-6th Grade), and another Bachelors degree in architecture. Informally, of course, I learn new things every day – especially, from all of the diverse expertise here at the SCA, with so many architects and engineers tackling such interesting and challenging problems! In the non-work side of my life, I enjoy woodworking, bicycling, hiking, and in general, just being outdoors. I am married to my partner of 36 years, a mathematics professor. We have a small stone cabin on a lake, in the woods, about an hour from New York City; it is our refuge and solace every weekend.

Q: What are your current responsibilities?

A: At work, I have responsibility for the work and well-being of the SCA's Architecture & Engineering Department – about 220 people involved in designing and managing the design of new schools and capital improvements for existing school buildings. With over half of our school buildings being more than 60 years old, there is a seemingly endless stream of repairs and upgrades, inside and out. I always say to my senior staff that we have two strands of responsibility: to deliver the projects and to develop our staff. My hope is that everyone in the Department is learning from their supervisors in a way that would make them want to be able to have that person's job in the future.

Q: Why did you leave teaching and decided to become an architect?

A: I stopped teaching kids because I had always also wanted to become an architect, and I had wonderful opportunity in NYC to go through the first 4 years of architecture school, at the City University of New York, at night and part-time (since I already had an undergraduate degree). I taught during the day, and went to school at night, and then during my fifth and last year for my Bachelors of Architecture degree,, I did that full time. At the heart of it, I'm the same person I was when I was teaching, and the two jobs call for many of the same skills – listening, communicating, and solving unique problems every day, caring about the process and the outcome. I can't say that I like one over the other, although my job now is on a vastly different

scale. But, which is more thrilling –sitting with a 7-year old at that "aha moment" when they grasp the concept of base 10, or being part of a team designing a Net Zero School Building – it's a tough call.

Q: What motivated you to devote yourself to education and specifically to the design of schools?

A: As I said, the unique challenges of addressing life as it changes and evolves. I had a teacher at Bank Street, where I got my education degree, who urged us, as we thought about what and how to teach kids, "Think about what is really important." In other words, keep your eyes on the big picture, the goals, what in the overall scheme of things, is <u>really</u> important. In both teaching and what I do now, I try to help and encourage people to be the best they can be; a teacher or a building can help people gain self-confidence and a sense of self-worth and well-being.

Q. You have established design standards which includes sustainability and other innovative guidelines. Please explain the importance of guidelines, and how they have led to a shift in approach the way schools are designed and built today?

A: The facts of climate change are indisputable. While the corrective work that must be done in order to reduce greenhouse gas emissions may seem expensive, and may not yet be the status quo, designing buildings for low energy use and other green attributes such as low water use and good indoor environmental quality is increasingly important. My department has technical standards for many aspects of design, for both new schools and for renovations and system replacements. Because we work on only one building type, it makes sense to establish consistent approaches and standards that have been thoroughly vetted and approved by the design group, the construction folks and the end-users (in our case the Department of Education, , teaching leaders, and Facilities' Operations and Maintenance department). Standards ensure the best chance of quality and positive outcomes across a broad-based program. Having said that, we also do offer an opportunity for designers to propose deviations if they will save up-front costs, and improve usability/durability or increase sustainability.

Q: You have been a propeller of green movement in New York City Schools, and under your leadership, the first Net Zero school was designed and built. Can you tell us a little more about the Net Zero School and what are your future plans in this direction?

A: The Net Zero School was an opportunity seized when we were given the design assignment for a small (444 seats) primary school on a large (3.5 acres) site in a very low scale residential neighborhood. As you know, to achieve Net Zero, a building must produce as much or more energy on site than it uses over the course of one year. At our school electricity is generated by over 2,000 photo-voltaic (PV) panels mounted on the roofs and south-facing exterior walls of the school. Our large site allowed for a 2-story building - this gave us a lot of roof area for PV's, and an opportunity, via skylights, to bring daylight into both the first and second floor via offset corridors. During the design of this project, every choice was informed by one almost absolute goal -to achieve Net Zero. This idea of having a singular focused goal turned out to be perhaps the most powerful and enabling tool in our kit. Every time we had a decision to make, we knew where to look – did it help us make Net Zero?

Already, many of the new ideas and components adopted for the Net Zero School four years ago become standards for new and existing schools, including LED (light-emitting diode) lighting throughout, automatic light and power controls, permeable paving, and induction displacement for classroom Heating, Ventilation, and air Conditioning (HVAC).

Q. Where do you think the evolution of school design is heading?

A: Design for flexible use is one of our key tenets – we never know when the schools population and enrollment may shift. Two years ago, Universal Pre-kindergarten was a new mayoral initiative across the city, and flexible design of newer K-5thgrade schools was a benefit. Since the early 1990's we had designed many new 1st and 2nd grade classrooms for possible Kindergarten expansion, equipping them with dedicated toilet rooms. Now, they helped in addressing the Pre-K need. For technology, wireless internet access is available throughout the school buildings, new and old, allowing flexibility for computer-supported curriculums.

Q: How do you manage to be actively involved in design process while carrying the enormous administrative responsibilities that comes with the office of the Vice President?

A: Being actively involved in the design process of projects is, for me, like having dessert before eating dinner. It is my total pleasure to participate in design meetings with the team, even when it means that I stay late to catch up on my own individual must-do.

Q. As a former teacher and an active architect, how do you describe the role of architectural design in creating a positive educational environment?

A: I think that when we work directly with school folks, my background in education is a trust-builder. Having taught kids for 12 years, I have an appreciation of the demands and challenges of the teaching profession, and I can speak the language and share some stories that may help them to feel comfortable as participants during design. I believe that when students enter their school building every day; they should feel that the building is a special and safe place for them to learn and be part of the school community. One job of the school building is to provide places to build community and good citizens of that community. There should be enough different and diverse spaces, that when people think back on their school experiences they will remember their favorite part or parts of the building.

Q: If you are offered a job to lead the design of schools in Afghanistan, would you be interested?

A: If I were earlier in my career, I would say absolutely yes!

Q: As I know, schools in NYC are designed based on a program of requirements. There are no such requirements in Afghanistan. It is mainly about creating teaching space. What is your advice in order for Afghanistan to also move in the direction of designing schools that will really meet the needs of all students?
A: What will be a good start? We use a Program of Requirements to deliver on the expectations of the department of Education and their school leaders; we also use it to predict and hold to a budget – the list of spaces required also lists the required areas. There are building codes, and state and city regulations about school facilities, and about the amount of time students should be offered various educational programs, both academic and physical education, and our Programs are a reflection of those

requirements too. Communication and input from all sectors needs to be the basis of creating worthwhile Programs.

Q: What is your advice for those who are involved in designing and building schools?

A: Question everything. Ask and understand how things work, and why things are needed. Consider all the options; sometimes one aspect of a solution that seems great or horrible may need to shift, and it ends up unlocking the whole puzzle. Give yourself deadlines, but take the time to brainstorm with your colleagues to come up with the best overall solutions. Most of all, at the outset, one should be very clear about the goals, and then figure out how to get there.

Thank you for taking the time to share your wisdom, thoughts and experience with the readers of the newsletter. On behalf of the Society of Afghan Engineers, I congratulate you on your outstanding accomplishments and service to the children and your lifetime of experience and achievements.

Reminiscing the past.

Graduation party for the Civil Engineering class of 1978 (1356), Faculty of Engineering, Kabul University.

Shown in the picture are some of the CE students and two professors, Ustad Mujtaba Khan, and Usatd Amin Imam.

At the time, as a result of dedication of the Engineering Faculty (professors), the Faculty of Engineering at Kabul University was a power house in engineering education in the region. Thank you Faculty of Engineering professors.

Submitted by Saleh Keshawarz, class of 1356 Picture: Curtsey of Najib Barati, class of 1356

Standard Precipitation Index (SPI)

A Drought Index for Afghanistan

By: Dr. Mohammad Saleh Keshawarz, P.E

Summary

Afghanistan has been struck by major natural disasters throughout its history. The more common disasters that have inflicted human suffering and have had significant socio-economic impact on the general public are floods, earthquakes, landslides, and droughts. Planning and preparedness for these events are minimum- to non-existent. Though there have been some improvement in the past fourteen years, but these mainly have been temporary and donor dependent and have not been translated into institutional building.

Drought and drought preparedness is one such area that requires fundamental change in the attitude of disaster managers, if any exists, toward this "creeping disaster". Traditional approach in Afghanistan has been that when we are fully into the later stages of drought and when general public are severely affected, we start panicking and look for mitigating measures and unfortunately, at times, it may be too late.

To plan and prepare for drought, it is imperative to have a sense of when droughts are likely to occur and have ways of measuring their severity and prepare accordingly. Drought indices are guides into the nature and intensity of droughts and depending on the region and end users, different drought indices are developed. One such index is the Standardized Precipitation Index (SPI) which uses historical precipitation data, has been suggested to be selected as the drought index for Afghanistan because of its simplicity and relative availability of data.

Background

Afghanistan is predominantly an agrarian society with close to 80 percent of the population living in rural areas and directly dependent on natural resources for livelihoods (small scale farming, pastures and forest products). Agriculture in Afghanistan is highly dependent on precipitation. There are roughly 3.9 million ha of cultivated land in Afghanistan, of which, about 1.3 million ha are rain fed. Although irrigated area produces more than 85 percent of all agricultural products, the contribution from the rain fed areas is of significant importance in meeting the food and fiber requirements of large population living in these areas.

Irrigation water sources are mainly from snowmelt rivers, groundwater, and from direct precipitation. Precipitation, on the other hand, is scanty and highly variable over most of the country. There are few areas in the country where soils are suitable for agriculture and rain fed crops can provide a reliable basis for livelihoods.

This overdependence on agricultural products threatens the livelihood of the population when there is a shortage in precipitation. Successive years of low precipitation create drought conditions with devastating consequences for the population and livestock. It seems that drought occurs in cycles in Afghanistan. Figure **1** shows the annual precipitation in the selected provinces from 1968/1969 to 1975/1976 when some of the most devastating droughts in the country occurred[1]. As is evident from the precipitation chart (Figure 1), every three to four years of good rainfall is followed by two to three years of low rainfall which results in low yield in the rain fed areas causing widespread drought-like condition.

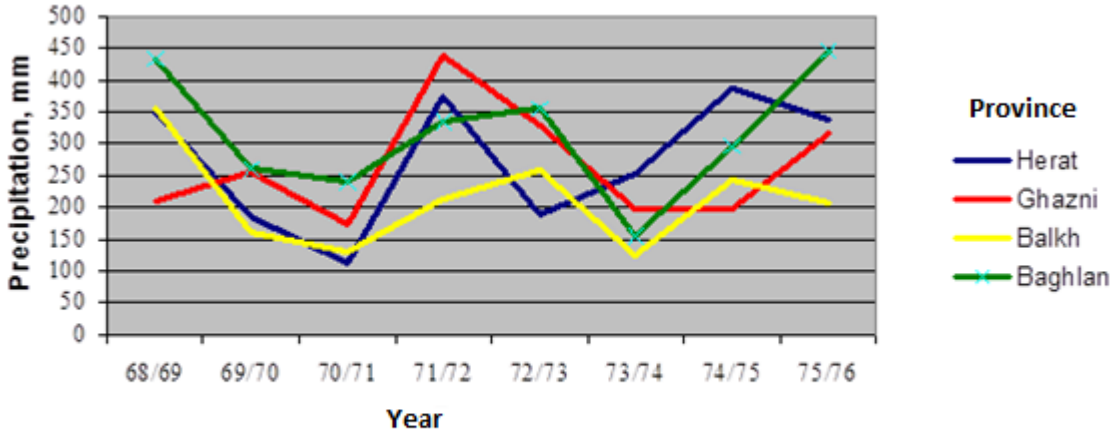

Figure 1: Precipitation 1968/69 - 1975/76

The drought of the late 60's and early 70's was a particular harsh one when people, especially from areas where they depended on rain-fed agriculture were forced to migrate to other parts of the country. To survive, they were forced to sell not only their cattle, but in some cases, their children as well.

Drought also creates lack of access to safe drinking water. Moreover, the losses of water resources increase the risk of water-related health problems and waterborne diseases. Prolonged drought results in a reduction in irrigation capacity, and therefore, a reduction in the amount of cultivated land. It increases dependence on harvesting of trees and shrubs, causing significant reduction of the forests and pastures in the affected areas. During droughts, rural villagers are forced to migrate to urban areas due to the lack of water and employment opportunities. Poor and middle income rural households have been forced to borrow money against their land, livestock, and other property. Recovery of income and asset losses is slow and often nonexistent.

[1] Central Statistics Organization, Kabul, Afghanistan

The effect of drought on agriculture production is the most critical drought related affect in Afghanistan. In 2008, Afghanistan had a 1.2 million tons of wheat deficiency affecting 17 provinces. In-country production of wheat provides approximately 75-85% of domestic market needs and varies considerably from year to year.

Most farmers are engaged in subsistence or near subsistence farming systems, contributing to a high number of farming families with risky livelihoods. The average precipitation in some parts of the country is only sufficient to sustain a rain fed winter crop. These farmers are highly susceptible to droughts.

Drought damage to rangelands and a falling groundwater table results in a reduction of livestock feed and a decrease in livestock numbers. The most severe effects of drought on rangeland have been felt in the dry rangelands of south and west Afghanistan. In addition to lack of feed, decreased animal numbers have been caused by migration out of the country.

In the 1970s, Afghanistan was self-sufficient in the production of meat and milk and had significant exports of animal, fiber, and high-value processed products such as carpets and skin garments. Due to severe drought and decades of war, livestock numbers may have been reduced by up to 50%. Expansion of Afghanistan's population has resulted in an increase of rain fed wheat cultivation onto marginal lands, which were once the source of winter grazing for millions of sheep and goats.

Drought Management

Drought is considered to be a "creeping disaster". The devastating effects of a full drought will not be known until full drought conditions prevail. As depicted in Figure 2, a meteorological drought characterized by precipitation deficiency is a first sign of imminent drought[2]. Agricultural drought is followed when there is considerable soil water deficiency, and hydrological drought occurs when there is substantial reduction in stream flow which will result in substantial socioeconomic impact on the general population.

[2] National Drought Mitigation Center, University of Nebraska

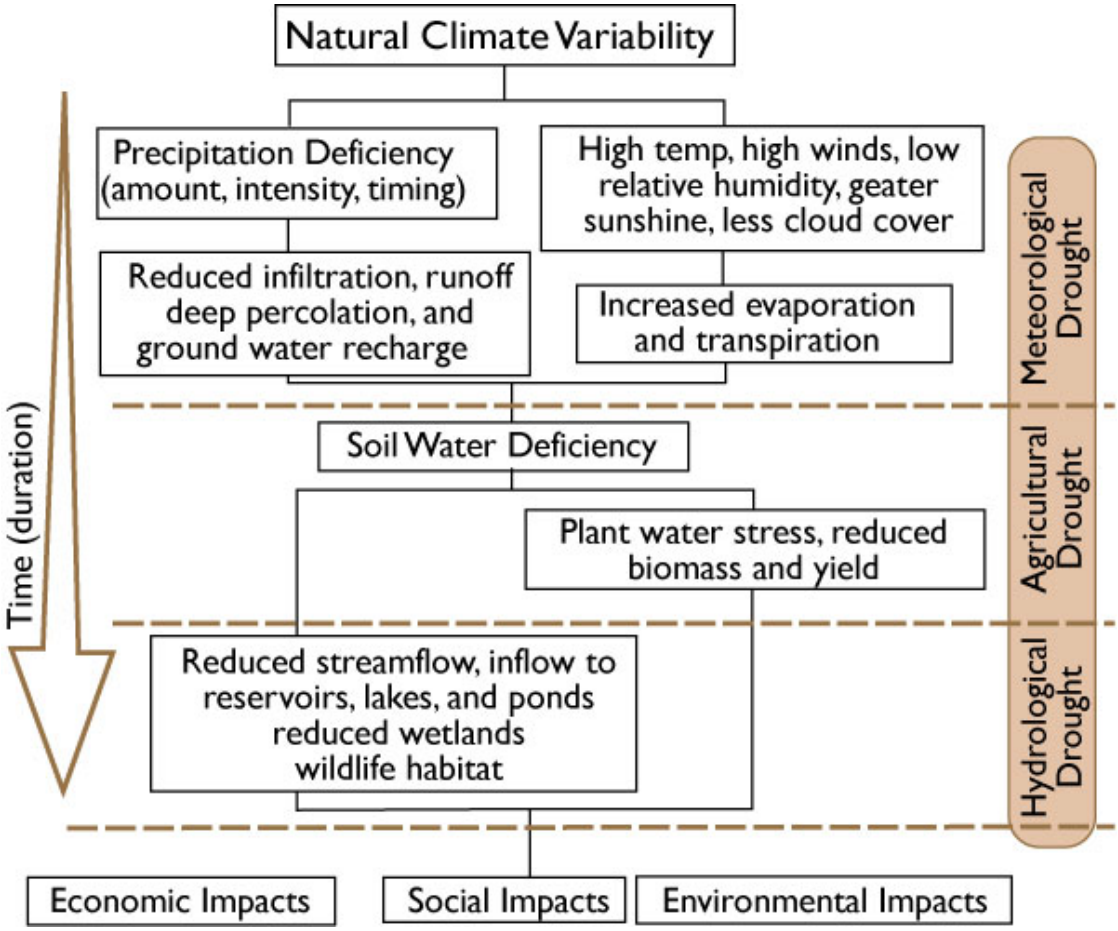

Figure 2: Types of Drought

Drought preparedness is an integral part of the government's responsibility anywhere in the world and Afghanistan cannot be an exception. In order to avoid the catastrophic effects of droughts on the general public, there has to be drought monitoring system in Afghanistan. One cannot have a drought monitoring system without having a drought index which measures the severity of drought.

<u>Drought Indices:</u>

Different indices are in use around the world for measuring drought severity. The preference of one over another is the availability of data and the choice of the end users. For the sake of brevity, a few with pros and cons are presented here:

1) **Percent of Normal –** It is calculated on the basis of actual precipitation for each location.
   a) **Pros -** It is effective only in a single region or season

b) **Cons -** It cannot determine the frequency of the departures from normal or provide comparison with different locations.

2) **Standardized Precipitation Index (**SPI) - It is calculated from the long term record of precipitation in each location (at least 30 years).

a) **Pros -** It can provide early warning of drought for each location and is well-suited for risk management.

b) **Cons -** The data can be changed from the long term precipitation record.

3) **Palmer Drought Severity Index (PDSI) -** It is calculated from precipitation, temperature and soil moisture data.

a) Pros - It can identify abnormality of drought in a region and show the historical aspects of current conditions.

b) Cons - It will not present accurate results due to effects of frozen ground and snow. Also tends to underestimate runoff conditions.

Standardized Precipitation Index (SPI) A Proposed Drought Index for Afghanistan

Form several drought indices studied, the Standardized Precipitation Index (SPI) seems to be the simplest and the most suitable index that could be adopted for Afghanistan. It is easy to use and the required data is either available or could be assembled with the technical capabilities of the Afghan experts. Some of the features of SPI are:

- It is a simple index which is calculated from the **long term record of precipitation** in each location (at least 30 years).
- The data can be **fitted to normal distribution** and **be normalized to a flexible multiple time scale** such as 3-,6-,12-,24- 48-months etc.
- Mathematically, the SPI is based on the cumulative probability of a given rainfall event occurring at a station.
- It is based on the historic rainfall data, and can tell the probability of the rainfall being less than or equal to the average rainfall for a specific area.

- Positive SPI values indicate greater than median precipitation and negative values indicate less than median precipitation.

SPI values range from a value of (2) and above, signifying extremely wet periods, to (-2) and below representing extremely dry periods as shown in the Figure 3[3].

SPI values	Category
2.0 and above	Extremely wet
1.5 to 1.99	Very wet
1.0 to 1.49	Moderately wet
−0.99 to 0.99	Near normal
−1.0 to −1.49	Moderately dry
−1.5 to −1.99	Severely dry
−2.0 and less	Extremely dry

(By McKee, 1993)

Figure 3: SPI Classification System

SPI gives a reasonable warning as to the temporal spread of a drought. As explained below, it provides precipitation comparison over 1, 3, 6, 9, and 24 months.

- **1-month SPI:**
  - Is very similar to a map displaying the percentage of normal precipitation for a 30-day period.
  - In fact, the derived SPI is a more accurate representation of monthly precipitation because the distribution has been normalized.

[3] McKee, T. B., N. J. Doesken, and J. Kleist, 1993: The relationship of drought frequency and duration of time scales. Eighth Conference on Applied Climatology, American Meteorological Society, Jan17-23, 1993, Anaheim CA, pp.179-186

- **3-month SPI:**
  - Provides a comparison of the precipitation over a specific 3-month period e.g. December – February.
  - Reflects short and medium-term moisture conditions and provides a seasonal estimation of precipitation.

- **6-month SPI:**
  - Provides a comparison of the precipitation over a specific 6-month period e.g. April – September.
  - Indicates seasonal to medium-term trends in precipitation and is still considered to be more sensitive to conditions at this scale than the Palmer Index.

- **9-month SPI:**
  - Provides an indication of inter-seasonal precipitation patterns over medium timescale duration.
  - SPI values below (-1.5) for these timescales are usually a good indication that dryness is having a significant impact

- **12-month up to 24-month SPI:**
  - Is a comparison of the precipitation for 12 consecutive months. Reflects long-term precipitation patterns.
  - SPIs of these timescales are usually tied to stream flow, reservoir levels, and even groundwater levels.

The program is available in a Windows/PC version and can be downloaded for free.

<http://drought.unl.edu/MonitoringTools/DownloadableSPIProgram.aspx>

Data Availability

SPI relies heavily on historical precipitation (30 years or more). In Afghanistan, however, due to many years of war, there is a severe data gap between 1978 and 2000. Data are either destroyed or nonexistent. Prior to 1979, data are available, but in hard copy format that needs to be

digitized. These data were being produced by the Civil Aviation Authority of the Afghan Government, copies of which are available from NOAA website[4] as shown in Figure 4.

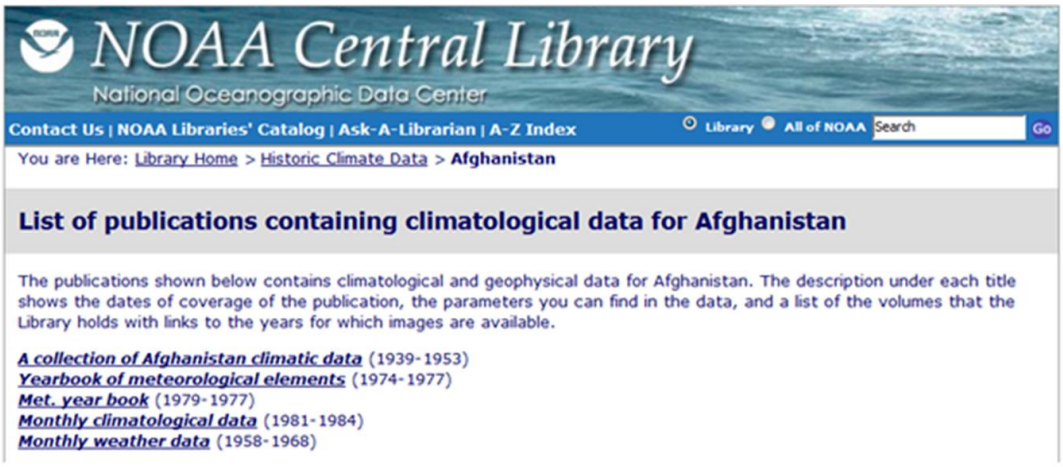

Figure 4. NOAA Website Referencing to Afghanistan Climate Data

Example of SPI using Afghanistan Data

As an example of how SPI works, historical data from a station in Herat[5] was entered into an input file and fed into the SPI computer program referenced above. Part of the output file is depicted in Figure 5. As clearly seen from the output data, the negative trend in SPI values started in late 60s and early 70s, with the worst felt in 1971 with an SPI value of (-3.07), which according to classification in Figure 3, it is extremely dry period. Had there been a system of drought monitoring in place at the time, precautions could have been take to alleviate the impact of drought which would have prevented migration from drought stricken areas.

[4] http://docs.lib.noaa.gov/rescue/data_rescue_afghanistan.html
[5] Curtsey of Mr. Wasim Iqbal

1970	*9*	*1.62*	*1.38*	*-1.63*	*-0.66*	*-0.64*
1970	*10*	*0.11*	*0.11*	*-0.82*	*-0.81*	*-0.81*
1970	*11*	*-0.99*	*-1.28*	*-1.22*	*-0.54*	*-1.04*
1970	*12*	*-1.55*	*-2.43*	*-2.55*	*-2.76*	*-1.16*
1971	*1*	*-1.74*	*-2.92*	*-3.07*	*-2.86*	*-1.69*
1971	*2*	*-0.11*	*-1.56*	*-2.00*	*-1.91*	*-1.54*
1971	*3*	*-0.16*	*-0.95*	*-1.72*	*-1.76*	*-2.09*
1971	*4*	*-0.29*	*-0.39*	*-1.69*	*-1.74*	*-1.68*
1971	*5*	*-0.36*	*-0.61*	*-1.57*	*-1.68*	*-1.64*
1971	*6*	*1.38*	*-0.56*	*-1.08*	*-1.64*	*-1.56*
1971	*7*	*1.93*	*-0.52*	*-0.46*	*-1.72*	*-1.60*

Figure 5. Precipitation Data from Near Herat, Afghanistan

Conclusions

Afghanistan is prone to the cyclic drought also known as the "creeping disaster', throughout her history. Every few years the country has been hit with this disaster and at times, with devastating effects on the general population. To plan and prepare for droughts, it is imperative to have a sense of when droughts are likely to occur and be able to measure their severity, and prepare accordingly. Drought indices are used to measure drought severity. They are guides into the nature and intensity of droughts and depending on the region and end users, different drought indices are developed. One such index is the Standardized Precipitation Index (SPI) which uses historical precipitation data. It has been illustrated in this article that SPI, because of its simplicity and availability of precipitation data, could prove to be the best drought index for Afghanistan at the present time. Historical precipitation data are available from internal and as well as external sources such as NOAA. It is hoped that by adopting SPI as a drought index for Afghanistan, an important step forward is taken toward disaster management.

About the author:

Dr. Mohammad Saleh Keshawarz, P.E. is Professor and Chair of Civil, Environmental, and Biomedical Engineering Department at the University of Hartford in West Hartford, Connecticut, USA.

Dr. Keshawarz was awarded his Ph.D. by the University of Oklahoma in Norman, Oklahoma with special emphasis on Geotechnical Engineering and minors in Math and Geology. He received his Master's degree in Civil Engineering from Tennessee State University in Nashville, TN., and B.S. degree in Civil Engineering from Kabul University in Kabul, Afghanistan. Dr. Keshawarz has over twenty five years of university level teaching and research experience. He is a Registered Professional Engineer in the states of Connecticut (active) and Virginia (inactive).

Dr. Keshawarz wrote the first water sector assessment on Afghanistan for USAID and served as a senior advisor to USAID on water issues. He led a team of international experts to assess soil and water in Afghanistan. He spearheaded attempts at resurrecting civil engineering education in Afghanistan and led a cooperative effort between Herat University and University of Hartford, through which engineering education at Herat University was revitalized.

Dr. Keshawarz has led numerous short courses and workshop on water management, shifting sand control measures, flood management, and water management in Afghanistan.

Dr. Keshawarz recently concluded an assignment with USAID, as its Water Team Leader in Afghanistan as such led a team of expert responsible for all USAID water projects in Afghanistan.

Dr. Keshawarz has traveled widely in the Central Asian region and is intimately familiar with the region. He was selected as a member of a team of scientists from the American National Academy of Sciences to visit the water resources facilities of Uzbekistan and Turkmenistan.

Membership News

In this section, the news about new membership, awards, promotions, retirement and loss of the Society members will be provided.

Achievements and Awards

The newsletter will inform their readers of winners of awards or any other successes of Afghan professionals and students, especially, their Society members. You can help the SAE eNewsletter editors by providing the news of the achievements, award winners, promotions, retirement, and any other success stories.

"Advise us of success stories or achievements of the Society members and any Afghan professionals and students."

Announcements:

(1) 2016 Membership Renewal

Dear Members of the Society:

The Management of the Society of Afghan Engineers (SAE) would like to remind all members that 2016 membership renewal and Annual fee of $60 are due. Your membership fee collectively would enable us to pay for some basic needed services of the Society such as Website security monitoring, updating and maintenance. Also, your membership fee would provide SAE's management the financial means to organize and host events and seminars on relevant technical topics. The membership renewal application can be downloaded from our website at www.afghanengineers.org

Please visit and like the SAE's Face book when you get the opportunity.

We appreciate your kind attention to the membership due request.

Sincerely,

Atiq Panjshiri

(2) SAE eNewsletter-regional Representatives

The positions of the SAE eNewsletter Regional Representatives are open. Please let us know if you are interested to volunteer for one of these positions or you want to nominate other qualified members to serve in these positions. The representative will inform the newsletter Editorial Bard of any technical news in their regions and contact authors for their contributions in the activities of newsletter. For additional information please send an email to SAE eNewsletter Editorial Board: Ghulam Mujtaba, E-Mail: *mujtabaghulam@bellsouth.net*; A. Wahed Hassani, Email: *awhassani@gmail.com*; A. Manan Khalid, E-Mail: *manank10@gmail.com*

MEMBERSHIP RENEWAL FEE AND DONATIONS IN 2016

The Society of Afghan Engineers

Date	First Name	Last Name	Fee Paid	Donation	Total Payment
3/8/2016	Atiq	Panjshiri	60	0	60
1/19/2016	Hafizullah	Wardak	120	0	120
1/19/2016	Yacob	Munir	60	0	60
2/27/2016	Steve	Rossi	60	40	100
2/22/2016	Gul Afghan	Saleh	60	40	100
1/24/2015	Abdul Nazeer	Babacarkhial	240		240
3/8/2016	Abdul Wahed	Hassani	60	0	60
2/22/2016	Abdul Manan	Khalid	60	0	60
3/8/2016	Reza M.	Afshar	60	0	60
3/8/2016	Yar M.	Ebadi	120	0	120
1/19/2016	AM Structure		120	0	120
2/8/2016	Ghulam	Mujtaba	60	60	120
2/22/2016	Shoaib	Ahrary	60	0	60
3/8/2016	Najb	Poya	60	40	100
3/30/2016	Hashim	Rayek	60		60
3/30/2016	Nadir	Sidiqi	60	60	120

Membership Renewal 2015

The SAE Membership Renewal Fee and Donations - December 31, 2015

Date	First Name	Last Name	Fee Paid	Donation	Total Payment
7/14/2014	William H.	Haight III	60	40	100
1/1/2015	Ahmad Farid	Haidari	60	0	60
1/1/2015	Homayon M.	Ibrahim	60	0	60
1/1/2015	Rafaat	Ludin	60	140	200
1/1/2015	Ashraf	Roshan	60	60	120
1/1/2015	Atiq	Panjshiri	60	0	60
1/12/2015	Hafizullah	Wardak	60	0	60
1/12/2015	Ghulam	Mujtaba	60	40	100
1/12/2015	Yacob	Munir	60	0	60
1/12/2015	Fahim	Panjshiri	60	0	60
1/12/2015	Steve	Rossi	60	60	120
11/22/2014	Gul Afghan	Saleh	60	0	60

1/24/2015	Abdul Nazeer	Babacarkhial	240		240[1]
2/6/2015	Abdul Wahed	Hassani	60	0	60
2/12/2015	Abdul Manan	Khalid	60	0	60
3/6/2015	Mohammad S.	Keshawarz	120	0	120[2]
3/6/2015	Abdul Saboor	Rahim	60	0	60
3/6/2015	Najim M.	Azadzoi	60	0	60
3/6/2015	Sayed F.	Abass	120	0	120
3/6/2015	Sohaila S.	Shekib	60	0	60
3/6/2015	Aziz	Ghani	60	0	60
3/6/2015	Mahjan	Saleh	60	0	60
3/27/2015	Sayed Aziz	Azimi	60	190	250
3/27/2015	Zarjan	Baha	60	40	100
4/1/2015	Mahmoud	Samizay	60	0	60
4/2/2015	Abdul	Chahim	60	0	60
4/11/2015	Aziz	Ghafoory	60	0	60
4/10/2015	Reza M.	Afshar	60	0	60
4/25/2015	Painda M.	Fakoor	60	0	60
4/25/2015	Sadeq A.	Ezzat	60	0	60
5/27/2015	Yar M.	Ebadi	120	0	120[2]
08/2015	Zabi	Zaca	120	0	120[3]

1-Mr. Babacarkhial has sent his membership fee for period of four years -Payment for 2014-2017

2- Dr. Keshawarz and Dr. Yar M. Ebadi have sent their membership fees for 2 years

3- Mr. Zabi Zaca sent membership fees for 2015 and 2016.

The attached form includes application for the new members and membership renewal. The application forms may be viewed at SAE website. The members are requested to take a few minutes of their time to inform the Society by sending their updated contact information. The completed application/renewal forms may be mailed to

Mr. Atiq Pnajshiri,
SAE President
P.O. BOX 11097
Alexandria, Virginia 22312

Thanks to members who have updated their membership renewal and have paid their annual membership fees. Also, the treasurer has received donation checks from a few members. Thanks for their generosity.

THE SOCIETY OF AFGHAN ENGINEERS ORGANIZATION

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THE SOCIETY OF AFGHAN ENGINEERS

MEMBERSHIP APPLICATION

Name: _____

Address: _____

_____

Phone: Home: _____ Office: _____

Email: _____

Degree Level: _____ Field of Expertise: _____ Years of Experience: _____

The active members of the Society of Afghan Engineers (SAE): Please mark (X) the appropriate box related to your address and other contact information.

- ☐ Yes, the above is a change in address or contact information.
- ☐ No, the above address is the same as recorded on the SAE's current membership list

Please mark (X) the appropriate box if you are submitting this application to join as a new member.

- ☐ A Regular member: I have at least four (4) years of architectural or engineering education.
- ☐ Associate member: I have at least two (2) years of architectural or engineering education

The SAE is a 501(c) (3) non-profit organization.

Amount of Annual 2016 Membership: $60.00

Donation: ----------

Total: ----------

Suggestion and comments: _____

Please send your check or money order payable to the Society of Afghan Engineers.

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