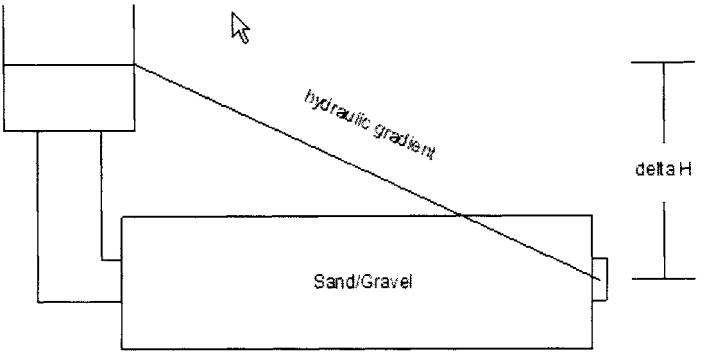

Figure 1. Testing Apparatus Sketch

Figure 2 shows a cylindrical tube (PVC or similar material) of a given length filled with the chosen material of study. The bottom end of the pipe segment is capped, and fitted with an output hole of a lesser diameter to concentrate water flow and simplify the flow measurements. A small piece of screen is applied to the interior of the smaller pipe to prevent the loss of sediment, while allowing water to easily pass through. The upper end is also capped with a small reservoir which is fitted with an inlet tube, allowing water to flow into the upper end of the sediment tube by gravity or by pump.

This upper reservoir is also fitted with a small outlet hole, allowing water to establish a consistent depth above the sediment, and then flowing through this outlet into a connecting drain tube. This apparatus allows the system to maintain a constant head, or the elevation difference from the upper outlet to the lower outlet (referenced from the bottom outlet). With this arrangement, if the apparatus is positioned vertically, the change in head divided by the overall length of the tube equates to a value of one, which simplifies calculations and allows the user to calibrate the apparatus with ease.

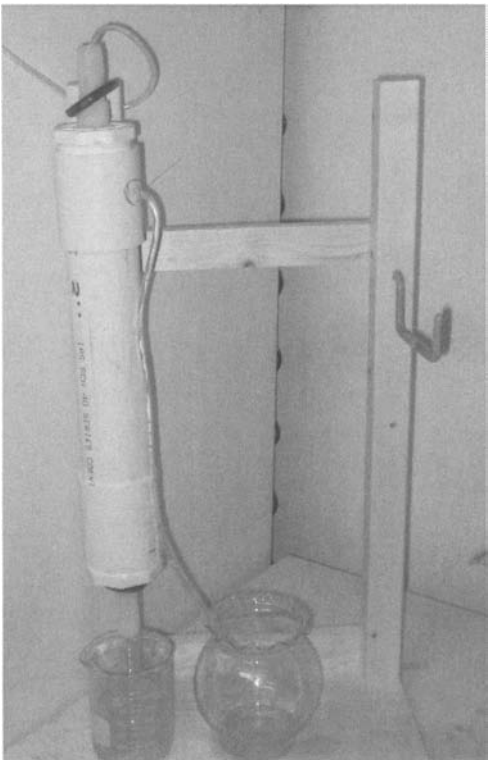

Figure 2. Prototype Testing Apparatus

As stated earlier, water is either siphoned or pumped from a container into the upper reservoir, and the excess water (coming from the outlet hole) is drained away to another container or re-routed to the initial container of water. A simple stand can be constructed to hold the entire apparatus, and should allow the tube to rotate by connecting the lower end of the tube to the stand at the lower reference head point, see Figure 2.

As can also be seen in Figure 2, the lower end of the apparatus has an outlet tube connected as well, allowing the draining water to be channeled more easily into a waiting measuring container (measuring cup, etc). By using a stopwatch or some similar timekeeping instrument, the amount of water that flows into the container can be measured over a given amount of time, which can then be used to find the hydraulic conductivity of the given material.

PROCEDURE

To begin the experiment, first begin the flow of water from the water container into the upper reservoir of the apparatus. Let the water flow until it begins to flow out of the outlet hole (making sure the output tube is set to drain into a waiting container), and adjust the input flow until the output flow is bubbling steadily out of the reservoir. (Bubbling ensures the water in the reservoir is level with the output hole because of the addition of air into the output line.)

Water is allowed to flow through the material and out of the apparatus for a period of at least one minute, or until the output flow becomes visually steady. It is easiest to start the timer when the water level in the measuring flask is at a quantified level (e.g. 25 mL), and stopped when the water level reaches the next measurable quantity (e.g. 50 mL). This time should be recorded as a flowrate, or in units of volume/time.

The cylinder can now be tilted to create a change in head elevation between the upper water surface and the lower water exit. Measure the vertical distance between the bottom pivot point (set at the lowest level of material in the tube) and the upper water outlet. This length is now the new ΔH for this system. The process of finding the flowrate can now be repeated for as many elevation changes as is necessary or desired, continuing until the tube is near horizontal.

All flowrates are recorded along with their corresponding head elevation differences. A simple way to find a K value for this material is to graph the results by hand or with any software program such as Excel. This can be done by modeling the Darcy equation as the equation of a straight line, y=mx+b, and setting "K" as the slope (or "m" in the equation of a straight line). Both equations compared look like: $Q = KA(\Delta H/L) \Rightarrow y = mx+b$.

Therefore, the flowrate (with appropriate units) gathered in the preceding procedure is graphed on the "y" axis of a graph, and $A(\Delta H/L)$ on the "x" axis. Typical values for the hydraulic conductivity of a material are given in units of "meters/day;" therefore, units that are graphed must be units of length and time. For example, if volume measurements are made in units of mL/s, mL must be changed to meters cubed or a length cubed, and seconds should be changed to days.

After all data points have been plotted on an appropriate graph, a "best fit" line is drawn through these points, or a trendline is added if using Excel. The slope is then found by using the standard slope formula: $m = (y_2-y_1)/(x_2-x_1)$. This value is the approximate value of the hydraulic conductivity of the studied material.

CONCLUSION

This type of procedure is vital to many aspects of civil and environmental engineering, as the process can be used in a wide variety of materials to determine the

amount of flow through these materials. Many types of materials are being used to incorporate sustainability into jobs and contracts. Pervious concrete and asphalt materials are now being used in many instances instead of non-pervious materials to increase groundwater recharge and natural filtration of water during storm events. These materials have been tested quite similarly to determine their hydraulic conductivity, as this is important in the substructure design for parking lots, roads, etc.

Environmental impacts of other types of materials can also be studied for their water absorption, and consequently their water retention as well. Some environmentally friendly groups are using materials such as chippings and refuse from sawmills to re-mulch areas void of topsoil due to strip mining.

Texas Section ASCE Leaders - A Time of Reflection
For Section Anniversary Planning

By
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I. Introduction

a. Background

The American Society of Civil Engineers (ASCE) states in their by-laws that the Society's ***objective*** is "the advancement of the science and profession of engineering to enhance the welfare of humanity." The Society's ***vision*** is to be "engineers as global leaders building a better quality of life." The Society's ***mission*** is to "provide essential value to our members, their careers, our partners, and the public through facilitating the advancement of technology, encouraging and providing the tools for lifelong learning, promoting professionalism and the profession, developing and supporting civil engineer leaders, and advocating infrastructure and environmental stewardship."

Over the last six months interviews of some 52 living Texas Section leaders have taken place. The backgrounds, families, education, careers, accomplishments, visions, mentors and special events in their lives have been captured in an Oral History file commemorating the 95th Anniversary of the Texas Section – ASCE. These interviews help to highlight how each leader has accomplished their ***objectives,*** shared ***visions***, and put his or her ***mission*** to work affecting the lives of our profession and the public in general.

b. The Call

In August 2007 Jerry Rogers cheerfully asked the Centennial Committee to think about the 95th anniversary and the 100th anniversary of the Texas Section! Unknowingly, I committed myself to a life changing event. Jerry's challenge actually gave me some focus in my own life to approach others with renewed interest, deepened respect and humility. Jerry's usually simple challenge was "Hey why don't you write a paper for such and so conference?" or "I have a favor to ask of you?" As many people in the Texas Section know, it is hard to tell that man NO! There is a way about him that exudes enthusiasm and fun! *Your vision may not be his vision, but his vision will become yours!* I told him that I would like to help, but did not know where to start. His reply was "Y'all figure it out." What evolved was a plan to celebrate the 95th anniversary in 2008 at a state meeting, and to celebrate the 100th anniversary in 2013 with a special event of some kind.

As any civil engineer knows it takes time, money, and commitment to organize, plan and execute a decent celebration of our history and heritage. Initially we started with a shoestring budget and a heart felt commitment from several History and Heritage committee members. Many engineers are motivated by a natural curiosity to see how some of the older than average members of our profession did things "way back" when. These engineers would like to take the "Way Back" time machine, and see how engineers used design tools like slide rules, typed computer key punch cards, a Leroy lettering guide, surveyed with mechanical instruments to such exacting standards, or used a planimeter. Also, how were these tools used in the successful design of such durable and aesthetically pleasing structures?

c. Approach

Our first approach was to solicit financial help from ASCE National through the use of a State Public Affairs Grant (SPAG) application to aid in the interview process. This grant enables Sections or Branches to provide an outreach to the public concerning the civil engineering profession. To this end a grant application was written and submitted in October, 2007 to the Public Affairs grant committee. The grant request for $10,000 was crafted so as to help the Texas Section defray the cost of producing the interviews:

"This grant application is for the purpose of defraying the cost of scheduling, interviewing and working on a video history of past presidents, distinguished members and executive secretaries of the Texas Section ASCE. The net result would be a DVD documenting the interviews and questions asked of some 50 individuals who are still alive to document a history of civil engineering legacy in Texas going back over 50 years. This grant would be used to accomplish that goal."

Unfortunately, since the money would only be used for the Texas Section, ASCE National felt that this was too inwardly focused, lacking a public outreach element, and so denied our request. With this knowledge behind us, we appealed to the Texas Section Executive Committee for funding this process in February, 2008. We asked for $10,000 and fortunately, our request was approved unanimously at the April 2008 Section meeting in Corpus Christi, Texas.

II. Getting Started

A. Getting Started – Texas Section Help

Elizabeth Greenwood, office manager for the Texas Section, ASCE, was extremely helpful in gathering names, addresses, email, and contact information for all past presidents, distinguished members and executive secretaries. This information was then used to contact all prospective interviewees over a six month period. As mentioned earlier a Centennial Committee was formed with the mission of researching the History and Heritage of the Texas Section ASCE and in some way memorializing the past deeds and accomplishments of former leaders in the Section. The first idea or thought of doing a DVD of Past presidents and Executive Secretaries occurred in August, 2007. Jerry

Rogers (Mr. Basketball) encouraged members of the Texas Section History & Heritage Committee to form a Centennial Committee, get organized, and determine how to go about doing a DVD or Oral History. To begin this process a Centennial Committee meeting was held in Austin, Texas on January 11, 2008. Committee members included:

- Jack Furlong
- Martha Juch
- Elizabeth Greenwood
- Tim Newton
- Ricky Bourque
- Charlie Dodge
- Nancy Cline
- Mark Assaad
- Roger Begham
- Ken Rainwater
- Carol Ellinger
- Melinda Luna
- Vernon Wuensche
- Mark Boyd
- Richard Furlong
- Gary Struzick
- Stan Sarman
- Cindy Jones Englehardt

Several ideas were discussed, but it was decided to move forward with the oral interviews and plan something for the fall meeting in Dallas. Also, teleconferences were held every month from May through September, 2008 to coordinate activities.

B. Texas Section Poster Help

Fortunately, at this time Ms. Melinda Luna was compiling a history of each of the past 95 Texas Section presidents. Her effort involved creating a PowerPoint presentation and a poster of the Texas Section presidents (from 1914 to 2008). To accomplish this task, Melinda used the Texas Civil Engineering (TCE) Magazine as the primary source of photos. To start about 30% of the necessary photos were collected from past articles and papers written by members of the Texas Section History and Heritage committee. To monitor the progress and possible sources of photos a spreadsheet was created. After exhausting the usable photos from the TCE and Texas Section archives, the task was about 85% complete. A list of possible sources of photos was listed for the remaining past presidents. Then emails and phone calls were made to various organizations in Texas and through out the country. This list included, other engineering organizations, Sons of the Texas Republic, Texas Department of Transportation, University of Wisconsin, Texas A & M University Cushing Library, Brazos River Authority, and many other organizations to long to list.

The original idea was to get a photo of the past presidents at the time that they served as president of the Texas Section president. For the harder to find photos, the first useable photo was used. Some photos found for the earlier presidents were unusable due to shadows on the faces because of hats which were the style in the early days. About 95% of the photos were found, and for the future it is hoped that photos will be found for all the presidents. From the power point presentation, a poster was created and displayed at the Texas Section October 2008 meeting in Dallas. The poster was a source was a source of discussion and enjoyment for the members attending the Ice Breaker. The present plan is to update the presentation and display the poster and presentation at the 100th anniversary of the Texas Section.

C. National ASCE Help

Carol Reese was very supportive of the Oral History effort. She directed us to the Oral History section of the ASCE website. She encouraged the Texas Section to submit a SPAG grant initially for conducting an oral history program. She also dug up some old files for use in researching the past Texas Section leaders. It should be noted the ASCE Oral History program (Appendix B) is about three pages long and gives some very helpful guidelines in interviewing techniques, questions to ask, recording the information and a release letter allowing later use of the interview for ASCE purposes.

III. Interview Questions

a. Oral History Program

Getting started was complicated by not knowing how to conduct an oral interview, what questions to ask, how long should the interview last, where to conduct the interview, is this intellectual property, and who does the editing, what format to record, edit, store files. Presentation of the file, resume, and photo of the individual had to be worked out with ASCE National and the Texas Section.

The ASCE National website link for Oral History Guidelines is located at: http://content.asce.org/history/hh-oralhistory.html these criteria served as a general guide for setting up a branch or section oral history program to start the process of scheduling, interviewing, editing, and producing a DVD. The Centennial Committee generally followed this format, but taking some liberty during the interviewing and editing process to personalize the final cut versions. The editing process took an enormous amount of time, and became a labor of love by Mark Assaad, the author and others.

b. Questions to Ask

As stated above the Texas Section office graciously sent the Centennial Committee a spreadsheet showing the living Past Presidents, Honorary members, and past executive secretaries. From this compilation a hit list of some 52 individuals was made and contacted to conduct the oral or audio interviews. There were a few individuals we were not able to interview for a variety of reasons. Two audio interviews were done due to time and travel costs. A list of questions was compiled for Past Presidents as indicated below:

1. What years did you serve?
2. Who was Executive Secretary?
3. What was the most significant issue or event you dealt with?
4. What was your most memorable experience or event?
5. What was your most embarrassing experience or event?
6. Did you start any major initiatives while in office?
7. Did you have a mentor, or someone else who encouraged you to participate in ASCE?
8. Do you think involvement in ASCE enhanced your career?
9. Have you ever held an office before this experience?
10. Did you write any paper of your experiences?

11. How many branches did you visit? Student Chapters?
12. Why did you decide to run for office? What motivated you?
13. Did your wife or spouse support you?
14. How old were you?
15. What did you not like about your term in office?
16. What did you like about your term in office?
17. Any advice you would give others who seek your office?
18. How did it feel to be a past president?
19. Do you or did you go on to serve ASCE in other capacities?
20. Are there any other family or relations following in your footsteps?
21. Are you happy now?
22. Would you ever be foolish enough to do this again?

The question/answer format above was not strictly followed. It became obvious that this list provoked some awkward one word responses, and we needed a broader approach to get individuals to open up about their lives and careers.

c. General Format

Generally, we tried to set up a casual atmosphere in which to ask some probing questions like where the person grew up, early education, other family members in engineering, any teachers/mentors who greatly influenced their careers, early involvement in an ASCE student chapter, year as president including branches visited and student chapters visited, any involvement at a regional or national level. Lastly, we asked if the interviewee would do it all over again.

Following this generalized format proved to be the most effective way of interviewing everyone. It is very hard to get engineers to open up in general. Engineers like to answer questions with one or two word sentences, or questions. Yes. No. Why? As an interviewer you have to be able to switch gears fast and think ahead as to where you want the interview to go.

IV. Interview process

To my knowledge, no one has written a book entitled "*How to Interview Civil Engineers for Dummies*". The interview process has taken about six months from start to finish. There was no set schedule, but generally a goal of conducting two or three interviews at one time or as time permitted. Each individual was contacted in person, via phone, or email, to set up an interview, do it, and then follow up with a DVD of the uncut and edited versions of the taped interview.

a. Scheduling – Phone, in-person, via email

Scheduling interviews is always a challenge. Getting started was difficult, because time and money were involved and the process of filming, questioning, editing, and producing the interviews has to be planned out ahead of time. What evolved was a hybrid of several seemingly different and disparate questions, settings, and processes that eventually

lead to an Oral History program tailored to the Texas Section. Also, one in which the filming, questioning, editing, and production could be handled by one or more persons. A Canon VCR camera was used during the production of the interviews and taping. A small tripod was used which allowed for the voice and audio taping in a variety of settings. These are described below.

b. Settings – Hotels, Homes, Convention Center, Offices - Video and Audio

Several different settings were used to stage the interviews. The first interview was conducted in my own house at Easter. I had the honor of interviewing my father who had served in all three categories of individuals selected to be interviewed. The very first attempts were sophomoric at best! I read the questions in numerical order and he answered them in numerical order. It sounded like we were taking a menu order! After this experience I threw out the rules and winged it…It really helps to do the interview on a conversational basis and make the person feel at ease with the subject matter.

An interviewer has to be adaptive to his surroundings. I interviewed people in hotel rooms, offices, universities, retirement homes, golf courses, country clubs, restaurants, houses, and one in the Hawaii Convention Center auditorium! The trickiest was probably the golf course. I had to be careful on my timing and delivery of the questions and answers, so as not to slow down play in an ASCE sponsored tournament! Generally, the interview went well, but the VCR battery went low fast. One of the most interesting interviews took place at the Hawaii Convention Center. There I interviewed Conrad Keyes on stage. He was very laid back, and wore a Hawaiian shirt for the interview. Two of the interviews were conducted via telephone due the travel time and distances involved. I interviewed Ed Segner and Ed Sokolowski by telephone. They both were very patient and well informed. I recorded the audio part of the interview with the VCR focused on my granddaughter's picture!

c. Process

For the oral interviews, I had to use a video camcorder which allowed me to interview the person, and take notes as appropriate. I used a *Canon ZR300* digital video camcorder, which I mounted on a small tripod to set on a table top or desk, for the interview. Most of the interviews were very casual and informal. I found that the less formal and comfortable the surroundings, the more people were open to being questioned. I filmed the entire interview and processed or converted the analog file to a digital file using software entitled *Pinnacle – Plus* which is a very user friendly. Basically, the software allows the user to convert the file to an avi or mpeg format. If you ever do this, it takes time! The avi format allows a higher quality image to be created, takes up a lot of storage. The mpeg format is less quality, but viewable, and a lot less storage is required.

The first thing I did after filming an interview was to convert and transfer the file to a hard drive on my laptop. It soon became apparent that I could not store all the interviews on one hard drive. For the purposes of safety and time, I was advised to save the converted files on a separate drive and back them up. For this I purchased two external hard drives for myself and Mark. These hard drives each had one terabyte of storage space and offered the