Minutes by: Bob Allen, CDM Smith
Acting Secretary, Nor Cal PUG

Attendees:

Bill Chavez    SRCSD    chavezb@Sacsewer.com
Bob Allen    CDM Smith   allenrob@cdmsmith.com
Bonneau Dickson    Bonneau Dickson  dickson.bonneau@gmail.com
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Thomas Vedder    P&F Distributors    tom@pf distributors.com


Highlights from the presentations include:

Roberts McMullin, EMBUD, PUG Chairman.
Roberts gave an overview of the 2015 ASCE Pipeline Conference which was held August 23 to 26 in Baltimore, MD. The theme of the conference was “Recent Advances in Underground Pipeline Engineering & Construction.” There were over 850 attendees, over 80 exhibits from industry leaders, and over 180 presentations from 7 tracks:

- Trenchless Technologies
- Design & Construction 1
- Design & Construction 2
- Planning & Analysis
- Assessment & Rehab 1
- Assessment & Rehab 2
- O&M, Risk, & Safety
In addition, he summarized the following papers from the conference.

1. **Pipeline Design for Mitigation against Liquefaction-Induced Differential Settlement** by Yogesh Prashar, Annahita Hallah, Roberts McMullin, and Xavier Irias with EBMUD. The paper summarized a GIS structural analysis of EBMUD’s cast iron and steel mains to identify pipeline segments with potential for failure due to liquefaction induced settlement. This assessment was of vital importance for EBMUD to clearly identify areas in its pipeline network that are unlikely to perform during a seismic event. The analysis looked back at the Loma Prieta results and calibrated the settlement test. The evaluation predicted that many of the steel and most all of the cast iron pipes that cross liquefaction boundaries will very likely be damaged at a minimum PGA of 0.5 g, and the majority of steel pipes with 20-foot spans would fail when compared to steel pipes with 50-foot spans. Choice of pipeline span length is crucial in evaluating performance. The study suggested using 30-foot spans for steel pipes within a zone. When crossing zone, the study suggested a shorter span length of 20 feet. The study also recommended replacing the cast iron pipelines in areas of high relative settlements since they are most likely to rupture during an earthquake event.

2. **Strategic Management of AC Pipe in Water Systems** by D. Spencer, D. Ellison, and G. Bell with HDR and M. Walis, X. Irias, D. Dodge, R. Sakaji, and R. Bueno with EBMUD. The study found that a large portion of the asbestos cement (AC) distribution system was approaching an age at which the break rate was rapidly accelerating at 60 to 70 years of age. The study evaluated factors driving AC deterioration, appropriate levels of renewal investment, factors used to identify and prioritize pipe renewal, methods for condition assessment, the benefit of prolonging AC pipe life, and the benefit of lining or sealing the existing AC pipe. The study recommended that EBMUD: 1) In the next 5 years, increase the rate of AC pipe renewal from the current rate of 2 miles per year to 5 miles per year; 2) plan to increase AC pipe renewal targeting 10 miles per year by 2030; 3) re-evaluate the renewal rate by repeating the analysis every 5 years; 4) use historical number of break repairs as criteria for pipe renewal selection; 5) collect condition test date during break repairs and down-time opportunities; and 6) consider the use of structural rehabilitation as an alternative to open-trench water main replacement. Verify ability of proposed rehab method to withstand fracturing of the host pipe while pressurized.

**Bill Chavez, Sacramento County DWR, PUG Vice Chairman.**

Bill summarized the following papers from the conference.

1. **Microtunneling Technology implemented for the replacement of an aging one mile PCCP 36-inch force main to minimize environmental impacts** by Mark Notheis with CH2M and Brandon Schillo with Fairfax County DPWES. This paper is a case study of a trenchless replacement of a 36-inch PCCP force main in Fairfax County, VA. In 1994, 2001, and 2009, Fairfax County, VA completed spot inspections and testing using visual, petrographic examinations, and wire testing for tensile and torsional strength at different locations along an existing one mile 36-inch diameter PCCP pipeline which crossed an environmentally sensitive area. The purpose of the testing and evaluation was to assess the pipe integrity and determine if replacement or repair was required. Based on the analysis, it was determined that microtunneling was the most viable technology for
installing the new force main. Once the alignment was approved by all the key stakeholders, design proceeded including:

- Shaft design based on subsurface conditions
- Analysis of dewatering requirements for each shaft site using Plaxis Flow Modeling
- Ground and vibration monitoring plans
- A bentonite “frac out” plan
- A hydraulic analysis for the pumping surge on the Dogue Creek Pump Station.

There were six microtunneling shafts which had three different shoring designs. Shaft1 used soldier pile and wood lagging, two shafts used sunk—in caissons, and three shafts used sheet piping. The MTBM production rate varied from a minimum of 10 feet per shift to a maximum of 70 feet per shift. The key successes and lessons learned:

- Visual and physical testing of PCCP proved to be a valuable tool in assessing the condition of the existing main.
- Trenchless/tunneling technologies are viable options for replacement and installation of new force mains.
- Plaxis flow modeling is a useful tool in assessing dewatering needs for tunneling shafts.
- The Plaxis flow modeling results should be validated with actual field testing if time permits.
- Microtunneling proved to be good application for crossing wetlands and minimization of obstruction near a critical facility such as For Belvoir Base.
- Production rates of the MTBM varied and are dependent on subsurface conditions.
- Average MTBM shift production rate ranged between 29 ft/day to 35 ft/day.
- Geotechnical instrumentation with automatic feedback and global positioning system proved to be useful in monitoring ground settlement from remote locations.

2. **A repair program to minimize failure risk of highly distressed PCCP circulating water lines** by Murat Engindeniz and Mehdi Zarghamee with Simpson Gumpertz & Heger and Kevin Crosby and Ben Cluff with Arizona Public Service Four Corners Power Plant. This paper summarizes the rehabilitation of the three prestressed concrete cylinder pipe (PCCP) circulating water lines at the Cholla Power Plant in Arizona. Unit 2 has 1,700 feet of 66 inch PCCP pipe manufactured by Interpace in service for 37 years. Unit 3 has 2,600 feet of 66 inch PCCP pipe manufactured by Interpace in service for 35 years. Unit 4 has 2,200 feet of 72 inch PCCP pipe manufactured by Ameron in service for 34 years. Inspections over the years have shown a high level of distress throughout the pipelines due to widespread corrosion of prestressing wires. This paper presents the condition assessment, failure risk analysis, and repair methods used to minimize risk of failure for these highly distressed PCCP circulating water lines, and shares the experiences gained from this program over multiple outages. The conclusions from the rehab project were:

- The risk of pipeline failure even with widespread severe distress can be minimized by performing pro-active maintenance programs that include
thorough planning, proper selection and use of condition assessment, failure risk analysis, and repair methods, and evaluation of results based on sound engineering judgment.

- Condition assessment, failure risk analysis, and repair prioritization of highly distressed pipeline requires a combined evaluation and correlation of data obtained from multiple inspection methods such as Electromagnetic (EM) Inspections, verification of EM results by external inspection, internal visual and sounding, and failure risk analysis. Consideration of only one source of data may not minimize the risk of failure, considering for example that EM inspection results could not be verified by external inspection in some instance in Cholla.

- Severely distressed pipes with nearly all wires corroded away were identified by analysis of the EM signals by the inspection company. Failure risk and repair priorities can be assigned to these pipes using the results of internal inspection results of the pipeline accompanied by limited external inspection of a sample of highly distressed pipe.

- Repair of PCCP with internally bonded carbon-fiber reinforced polymer (CFRP) liners is an effective method even for severely distressed pipelines as they can be designed as a standalone system without any contribution from the host pipe, and installed quickly in many non-continuous pipe segments within a short period of time without requiring external access. Successful CFRP repairs required design according to the current state of the art presented in AWWA Draft Standard for CFRP Renewal and Strengthening of PCCP, including proper termination details and other special details, and also continuous engineering field support throughout CFRP installation for verification of compliance with repair drawings and specifications.

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Jimmy Dang, Oro Loma, PUG Treasurer.

Jimmy summarized the following papers from the conference.

1. **An Evaluation of Trenchless Point Repair Solutions for Pipes of Varying Inner Diameter and Offset Joints** by Rudy Ellgass with Rausch, Jey Jeyapalan with Civic Enterprises, Brian Gipson with Pipe Check, Mark Biesalski with Urig Kanaltechnik, Wayne Miles with CDM Smith, Steve Leffler with Norditube, John Kurdziel with Advanced Drainage, and Mark Bruce with Hydromax.

   The paper evaluated various trenchless point repairs methods. These can be broadly grouped into internal joint seals, mechanical sleeves, CIPP short lines and others. Some widely known brand names are: WEKO-SEAL, In-Weg seal, Quick Lock, Link-Pipe, LMK, HydraTite, Amex 10, and others. These products can be used for storm, potable water, wastewater and industrial pipes, conduits and drainage culverts. Quick Lock meets ASTM F3110 and is new in North America although it has been used for over 20 years in other countries.

   Quick Lock uses a locking sleeve that expands along a toothed strip with a small set of gears that are protected by a cover to prevent snagging of waste, build-up of sludge or sediment, and root cutter and cleaning nozzle entanglement. These features have a proven track record of over 20 years.
In pipes up to 32 inches in diameter (800mm) the sleeves are installed using an inflatable packer on wheels. The packer is usually connected to the camera or robot via a bracket and hollow link bar. For repairs more than 20 (6 meters) into the pipeline, the sleeve is installed most efficiently and accurately when the packer is pushed or pulled and positioned by using a crawler camera, equipped with an accurate distance counter. The actual installation takes only about 1 to 2 minutes.

2. **Development of a Wastewater Pipeline Performance Prediction Model** by Berk Uslu with VPI, Sunil Ninha with SWIM, and Thiti Angkasuwansiri with WERF.

The purpose of this research was to develop a wastewater pipeline performance deterioration model for predicting the remaining economic life of wastewater pipe for infrastructure asset management. The model used an iterative process. There are many different types of models including: 1) Statistical; 2) Stochastic or Probabilistic; 3) Advanced Mathematical; and 4) Heuristic models. The objectives of this project included: 1) Determine list of parameters and collect data; 2) Update performance index to assess the performance of gravity Lines; 3) Predict future performance of the pipe lines using updated performance index; and 4) Integrate the developed model with desktop and online GIS platforms for an effective dissemination.

Two graphs (A and C) were used to describe the theoretical levels of renewal and a third graph (B) described the likely reality of the situation. Graph A showed an asset reaching to minimum acceptable level of service without appropriate renewal. Graph C showed an asset that perfectly is constructed, installed, and maintained in its lifecycle. Graph B showed the lifecycle of an asset which is structurally and/or functionally adequate with various options for renewal: 1) no action is taken; 2) specifically renewed to reach its ideal performance level at its actual age and further improved to the performance level higher than the idea performance level at its age; and repeatedly renewed to maintain an acceptable level of performance over an extended time (graph looked like a saw tooth each time the pipe is renewed).

The results were compared to historical concrete pipe performance to develop a plot using regression analysis vs. expected values. Future research will develop the mathematical model, integrate the model with GIS, and integrate the model with the PIPEiD database. Integration with the PIPEiD Platform will provide effective dissemination and utilization of the prediction model nationwide.

3. **Share the Road: Challenges and Opportunities Facing Joint Pipeline and Roadway Construction Contracts** by Paige Cronin and Rami Issa with AECOM, and Rishi Bhattarai and Eduardo Valerio with Dallas Water Utilities.

This paper evaluated the problems and benefits of developing a joint pipeline and roadway construction contract in Dallas, Texas. Dallas Water Utilities (DWU) supplies treated water to 2.3M people in the Dallas-Fort Worth Metropolitan area (DFW). The East Side Water Treatment Plant (ESWTP) is a 440-MGD plant that has the capacity to meet nearly half the City of Dallas’ customer demands including its wholesale customer cities. A large regional pipeline project called the Southwest 120/96-inch Water Transmission Pipeline Project (Southwest Pipeline) was proposed with: 1) a larger capacity with a diameter of 120/96 inches; 2) a length of 32 miles; 3) provide redundant and increased service capacity to meet the growth of current and future DWU customers in Southern Dallas County; and 4) coordination between multiple agencies for a joint construction project. The Players included: 1) Dallas Water Utilities; 2) Dallas Public
Works Department – Telephone Road; and 3) Dallas County Public Works Department – Bonnie View Road.

This paper discussed the challenges and opportunities facing joint pipeline and roadway construction projects and covers lessons learned during several phases of the Southwest Pipeline project, including planning, design, bidding, and construction.

PLANNING
Planning addressed the following issues common to both projects:
Initial planning was coordinated with local agencies and jurisdictions to determine if there are any roadway expansion projects along the proposed pipeline corridor. In many cases, joint roadway-pipeline construction contracts were deemed the best delivery method for constructing the roadway and the pipeline.

Right-of-Way Acquisition. The type of ROW acquisition needed for both projects, whether fee simple or an easement, either temporary or permanent had to be determined. For the Southwest Pipeline, the majority of the ROW was acquired by fee-simple acquisition.

Overall Project Schedule. The impact of combining the projects on the overall project schedule needed to be evaluated. Each project may have a different driver and may result in different project timelines.

Funding. As separate projects, ROW acquisition, design, and construction would be funded separately. Funding must be decided during the planning phase to avoid any issues that may arise in the future during design and construction of the projects.

DESIGN
Alignment and Depth of Cover. The final alignment should be coordinated for each project during the design phase. Special attention to minimum pipe depth was a critical factor to accommodate utility crossings especially storm sewer systems. If the pipeline will be constructed first, then the depth of cover should accommodate any earth cuts along the pipeline alignment to construct the new road.

Utility Coordination. The road project may proposed water, sewer, and drainage improvements. Existing utilities along the existing roadway may need to be relocated to resolve conflicts with the proposed roadway and pipeline improvements.

Construction Sequence and Traffic Control. There can be multiple options for how the roadway and pipeline are constructed, but if it is thought out far in advance of construction it will allow for a smoother running construction phase.

Development of Contract Documents. The contract document development should coordinate between both projects and address:
1. Bid Items – bonding, mobilization, SWPPP, trench safety, traffic control, and concrete barriers need to be coordinated to avoid duplication.
2. Bidder’s Qualifications – need to be clearly stated for both projects by establishing the desired minimum previous experience for both the pipeline and roadway separately.
3. Terms and Conditions – typically the leading agency will use their own T&Cs for the joint contract. In some cases, hybrid T&Cs were used to accommodate the needs of both agencies.
4. Payment Terms – typical terms used by both agencies may be different and need to be harmonized before the bid phase

5. Quality Control – a roadway project may focus on concrete compression tests or soil compaction testing, while a pipeline project may focus more on embedment and soil compaction, holiday testing, and welding procedures, especially for steel pipelines. A common conflict that has been seen in the Southwest Pipeline project was the frequency and requirements of density testing.

6. Technical Specifications – in case of a conflict between the two projects, a hierarchy of standards should be established to avoid any unforeseen conflicts. It was very common to see the drawings and technical specifications for both projects signed and sealed separately in different volumes as long as any conflicts are resolved and clear direction are established in the front end documents of the joint projects.

**BIDDING**

**Construction Schedule.** Bidding coordination between the two projects involved a joint construction contract requiring a conformed construction schedule that would be agreeable to both the roadway and the pipeline agencies.

**Successful Bidders.** For the Southwest Pipeline, both projects were bid with specific pipeline installation qualifications and for both projects, the successful bidders were pipeline contractors. Since the roadway project was the main driver for the schedule, funding, and construction, it was initially thought that a roadway contractor would be selected for the joint construction project. It was observed during the pre-bid meetings for both projects that pipeline contractors with qualifying experience were taking the lead as the general contractor and pavement contractors would be able subcontractors.

**CONSTRUCTION**

**Submittal Review.** Construction submittal review was different for each project but the contractor was required to submit them to each entity involved in the projects. It is important to define the submittal review process in the contract documents and discuss this with the contractor prior to delivery of the initial submittals.

**Quality Assurance.** Proper quality control and assurance measures are especially necessary on a joint construction contract. Any issues that may arise on one project may impact the other.

**Material Delivery.** Material delivery was a significant issue that needs to be thought through during the design with definite provisions made in the contract documents. Storing the pipe material at the pipe factory may be an option until site conditions allow for delivery and stringing out the pipe at the job site.

**Inspection Services.** During the construction phase of both projects, onsite inspection should be performed on a regular basis.

**Handouts:** None.

Due to time limitations, Bob Allen will present a recap of the ASCE conference at the December meeting.

**General:**

Minutes by: Bob Allen, CDM Smith
Acting Secretary, Nor Cal PUG
September 8, 2015 Meeting Minutes: A motion was made to approve the minutes, which was seconded.

October PUG Training Recap: Roberts McMullin gave a brief recap of the October 16 all day training class entitled “Construction Law: How to Plan for a Successful Project” taught by Eileen M. Diepenbrock, Esq. and William L. Porter, Esq. from Lorman Education Services. The class was held at the CCCSD training room. There were 50 attendees. A raffle was held following the training course. A tour of the Black Diamond Brewery was held for PUG members afterward.

Announcements:

2015/2016 Membership: The 2015/2016 membership renewal forms are available and located on the PUG website: [www.norcalpug.com](http://www.norcalpug.com). Memberships cost is $350 per entity. Membership has numerous benefits, such as discounts for courses and conferences, participation in raffles held at random monthly meetings, discounts on attending the annual seminar, etc. Get your renewals and/or new member applications in today. Payment options include Paypal or check.

Financial Updates: The current total in the organization account is $45,396.53.

ASCE Continuing Education: ASCE has offered complete access to their on-demand webinars. For more information, you can go to [www.asce.org/on-demand-subscription](http://www.asce.org/on-demand-subscription).

NASTT Webinars: NASTT hosts complimentary webinar series to bring you professional instruction from leading experts in the field of trenchless technology. They can be found at [www.nastt.org/webinars](http://www.nastt.org/webinars). The website offers access to several archived NASTT webinars including: Manhole Rehabilitation; Pipe Ramming; Build Your Trenchless Toolbox; Carbon Calculator; CIPP; Condition Assessment for Watermains; Pipe Bursting, HDD, and CIPP for the Gas Industry; Slipping Sewer Laterals; Trenchless Rehabilitation Parts 1 and 2; and Trenchless New Installation Parts 1 and 2.

NASTT National No-Dig in Dallas, Texas March 20-26, 2016. Watch for details for the Municipal and Public Utility scholarships.

UIM 2015 Water Asset Management Conference. Deadline for early bird registration is October 9. The conference is December 2 – 3 in Arlington, VA.

PUG 2016 Sharing Technologies Seminar call for papers. The 2016 Sharing Technologies Seminar will be held on February 18, 2016 at His Lordships in Berkeley, CA. The keynote speaker will be Debbie Franco – the State of California Local Government Drought Liaison. Seven papers were selected for presentation. More information about the seminar will be provided in a flyer very soon...

Raffles: No raffle was held at this meeting. Remember, raffles can happen at any meeting but you have to be in attendance to win a prize.

Project Discussions:

Cindy Preuss asked for suggestions regarding a sliplining construction project that is having difficulty successfully lowering the groundwater due to the depth of the raw water pipeline that is being converted to storm drain. As a result, the contractor will be sliplining below the water
table. Potential issues: debris, pipe integrity, inability to grout the annular space. One section has been done successfully. The next push will be 900 feet long taking place today (November 10).

Bonneau Dickson mentioned that Vern Phillips had laser surgery recently to reattach the retina in one eye. He is doing well, recuperating at home.

Bonneau also asked if anyone had access to a card reader system design that he might convert to a recycled water truck access.

Nancy McWilliams noted that bid prices are much higher. On her most recent project, the low bid was $1.5 million which had an engineer’s estimate of $1.345 million. Rob McMullin mentioned that PUG will be emailing a bid result spreadsheet to the PUG membership to document project bid results for future reference.

**Next Meeting:**

The next general meeting is scheduled for Tuesday, December 8, 2015. The presentation topic is an “Overview of Civil 3D with a Focus on Pipe Networks” by Gaurav Bagga with Ideate, Inc. Please call Bob Allen at 925-296-8038 or email allenrob@cdmsmith.com for additional information on this month’s meeting minutes.