

PIPELINE TALES

ISSUE 2: JUNE 2022



A CANADIAN MAGAZINE FOR PIPELINERS

Publisher's Note

Good day to you all. Things are looking up in our energy sector. Stock prices are up, companies are hiring and spending money, and pipelines are getting built. We pray that things stay upbeat like this for years to come.

The pipeline industry is unique and a one-way street. Once you get in, you can never come out! It is hard to believe this notion, but it is true. Hundreds of individuals joined the pipeline business in their teens, and they are still very active in adding value to this industry.

Have you ever wondered why we stuck around in this business for so long? The main reason is that we pipeliners built such a unique bond that we do not wish to sever, and there is a satisfying feeling that we belong.

The principles of pipelining did not change; we still build pipelines the way we used to some 50 years ago, but we improved the operation a lot. Safety was not always an issue; the environment was not much of a problem either. But these matter very much now. In the good old days, we stripped with no care if someone was watching or not. Now we are cautious. Before beginning to strip, we take every precaution because many regulators now watch us carefully and tell us how and what to remove first.

Our first issue of this **Pipeline Tales** reached over 15,000+ readers digitally. We must have done something good in our childhood to get such an overwhelming response from our readers. We do not know the reasons for such support and well wishes. However, we think that our readers enjoy our simple vision of promoting the pipeline industry. This magazine will showcase pipeline projects in Canada and worldwide, promote pipeline-related companies with their products and stories, and encourage individuals to share their personal stories of success, adventures, and failures. The readers will learn that pipelining is no easy task; it takes smarts, dedication, and hard work, and it is a very safe transportation system.

So please help us to help you. We hope to hear from you soon, as we will publish our next issue in **September 2022**, and we genuinely appreciate your support.



Hiran Ganguli, P.Eng.
Publisher

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Readers' Comments

"This magazine seems to be a wonderful step towards making pipeline services more familiar and popular among people.... we know so little about this.. keep it up. I am proud of you..."

- Dr. Sue Deb, Kolkata, India.

"Hello Hiran, Thank you for the offer. I would like to contribute to the extent possible. Please guide me on how I could contribute. Thank You."

- Rameshkumar, Muscat, Oman.

"Hello, I have been a pipelayer since 1958. In February 1982, I had the chance to witness a project called "TransCanada," where the layout temperature of the pipeline was almost -50 degrees Celsius, whereas, in Algeria, we installed the pipes at a +50 degrees Celsius. (Just pointing out the big temperature difference) I've been retired since 1998, and I just wanted to say that it's been a pleasure to see that people are still working hard and being active in this field. Greetings from Algeria, and good luck with your work."

- Yahamed Yaker, Algeria.

"Hiran, we will rerun our ad. Please send a link that I can pay. Thanks."

- Garrett Dietrich, VP, Business Development, Cyntech Group, Houston, USA.

"Well done, Hiran!"

- Vahid Ayan P.Eng., MBA., Edmonton, Canada.

"Hi Hiran, it's been a long time since we did not chat. Recently I have been back to Calgary. This magazine is a very good initiative from you to publish New Pipeline Magazine to share the professional experience with other professionals."

- Muhammad Ali Siddiqui, Calgary

"Hi Hiran, very good pipeline magazine, Congrats."

- Luis de Benito, Barrio Santa Lucía, San Juan, Argentina.

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ACD Construction – A Company Tale

ACD Construction, an international pipeline construction company, was established in 2002 in Ankara, Turkey, to provide a broad range of pipeline construction services. As one of the leading pipeline construction companies with over 30 years of experience, ACD Construction aims to provide various pipeline construction services on domestic and international levels. We specialize in pipeline construction of oil & gas and water, pump stations, compressor stations, natural gas RMS station construction, oil field development projects & process piping works, hot-tap, line stop and line replacement operations. We have completed numerous pipeline construction projects on three continents and five countries. Examples include Azerbaijan, Turkey, Iraq, Algeria, and Libya.

With our large number of equipment and a professional team of experts, ACD Construction has become one of the indispensable organizations in the most critical pipeline projects. ACD Construction has laid more than 1,500 km of pipe where natural gas transmission and petroleum pipelines have been commissioned to be used by public and various industries across the Middle East and Turkey. This enables us to act as a focal contractor in our industry. Relying on our “know-how,” our motto is: *committed to excellence in pipeline projects.*

In summary, being one of the leading pipeline construction companies in the field of oil & gas pipeline projects with over 30 years of experience, we, as ACD Construction, have always been the solution partner of our clients, despite harsh geographical circumstances and challenging weather conditions. Please check our website for details.

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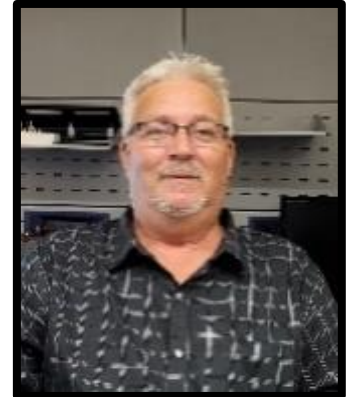
McElhanney



Safety Culture: What it was Like for me in the Past and What it's Like Today

By Andy Systema

I have spent forty years working in the Oil & Gas industry on pipeline transmission projects across Canada. My educational background is in geomatics, and I graduated from the Southern Alberta Institute of Technology in 1983. Today personal safety, the safety of others, and project safety are the most important to me during the execution of all pipeline geomatics projects. For me, it wasn't always this way. Over the past four decades, the safety culture in the pipeline industry (all industries) has positively changed. And with the changes, my commitment to safety has grown.



When we take the experiences of others with our own and combine that experience with education and training, we now have the knowledge we need to execute a project safely. When we do this repeatedly for a while, this knowledge and experience become our wisdom. This wisdom is what I like to rely on today instead of what many may call common sense (which may not be that common after all).



1961, John Sytsema and Andy Sytsema working in their grandparents' backyard.

Work started early for my brother (John) and me. This is a cute picture of us playing in my grandparent's backyard in 1961. Today when I look at this picture from a safety perspective, I see things differently. I see two workers who do not have the proper personal protective equipment, such as hard hats, gloves, safety glasses, CSA-approved steel-toed boots, and high visibility vests. I see the workers within the safety zone of the heavy equipment, not utilizing proper communication methods with the equipment operators.

Regarding ground disturbance, I do not see any buried facility stakes or documentation showing that the search area is cleared for ground disturbance and thus excavation work. I also question the experience and certification of the workers in the operation of the hand tools they are using.



- ✚ Are they using the right equipment for the job?
- ✚ Do we have a safe work procedure for the task?
- ✚ Are they certified to operate the equipment?
- ✚ Are they competent?
- ✚ Have they completed their daily hazard assessment form?
- ✚ The last question I have is, where did my brother get that haircut?

Safety was a part of my work history, but daily attention to safety was not valued much as productivity. Following are a few tales of the experiences I combined with my safety training and knowledge to gain safety wisdom (I use this word with much humility) in performing the many geomatics tasks I was assigned.

Tale 1

In the early seventies, I learned one lesson regarding safety that occurred with my brother John. John was working in the construction industry in the southern part of Alberta on a construction site building a commercial building with temporary hoarding around the outside. He went to work one morning, and upon arriving, John realized that he was to work outside for the day on a scaffold. This assignment wasn't a problem for John as he was used to working outdoors throughout the summer, but it was minus -28 Celsius on this day.

By 11:00 a.m., John said that he couldn't feel his feet any longer, so he proceeded to the supervisor shack and reported that his feet were not feeling right, and as they warmed up, they began to hurt bad. The supervisor decided that he should go home and have the feet checked out as they could not get the boots off his feet. On arriving home, my mother decided to cut the boots off and proceeded to do so, and when John's boots came off his feet, they were completely black. He suffered third to fourth-degree frostbite on both of his feet. It was not a good situation and resulted in him being off work for six months. At one point, they were looking at amputating his feet. Recently I talked with John about what he learned. It started with John being a young worker with improper work boots for the conditions, he had to leather steel-toed work boots with thin liners in them that were good for medium temperatures, but one thing that he did not do was dry out his work boots every night. From that day on, John purchased two pairs of work boots, one set for summer work and a set for wintertime that included removal felt liners that he could dry out overnight. As I started my working career, I took my brother's experience and made it my knowledge.

Be prepared for the environment that you are working in. Today, we have safe work practices for working in hot and wintry weather environments.



Tale 2

In the latter part of the seventies, I learned to swim. At fourteen years old, I could not swim, and by the time I turned eighteen, I was a certified lifeguard. I had my first exposure to personal safety, first aid training, and artificial resuscitations (AR) during my lifeguard training. This training was beneficial throughout my career, but the most important lesson I learned was about personal safety while performing a rescue on an individual who is drowning.

I could swim like a fish. I was able to complete all the required timed tasks, including retrieving an unconscious drowning victim and swimming lengths using all the different swim strokes, but what surprised me was that I had to learn how to escape from the clutches of a drowning person. As we approach a drowning or a struggling individual, we need to



assess the situation. Do we have anything to put between ourselves and the drowning individual without physically connecting? What are the hazards in performing the rescue? What type of risks is present? This all happens very quickly, and that is why when we approach a drowning person in what we call the rescue position. It is like the Karate Kid stance in the movie but only in water. This gives the rescuer time to assess the situation and determine if we have something to throw for the person to hang on. If not, then the problem becomes riskier for the rescuer. A drowning person will grab onto anything floating, including the rescuer. You must defend yourself from being held onto by a drowning person in this situation. Many have failed in this step and have been found drowned along with the person they were rescuing. Today we are trained to assess incidents and identify hazards to our safety before engaging in a rescue or aiding those who may require help.

In the eighties, another incident occurred that I have shared many times to show the importance of certified training, adequate hazard assessments, and

emergency response planning. I was working as a junior survey party chief in the Swan Hills area. My task for the day was to cut a survey line from an access road about fifteen kilometers north of Swan Hills, Alberta. We had been working on this for a couple of days, and we were one thousand meters into the cut line. I did not have a lot of experience cutting, so I was working away with all the proper safety equipment, including my CSA-approved hard hat, safety glasses, face visor, chainsaw pants, and chainsaw boots. What I did not have was the proper training and experience to fall trees of larger sizes. I was cutting down a large jack pine with an 80-centimeter diameter.

As I cut the tree, it leaned up against another tree. I decided I would make a cut about a foot above the first cut and see if I could get it to buckle back on itself and switch its position, and fall to the ground. I made the second cut, and the tree still would not fall. I became frustrated, so I kicked at the one-foot portion of the tree, and the one-foot portion of the tree came out. My foot landed on the stump, the tree fell on my foot with the tree still standing; and I was in a lot of pain, and I could not get the tree off my foot. My survey assistant pushed on the tree as I was still pinned to the ground, but it would not roll off the tree it was leaning against. At this time, I had to twist my leg and attempt to stand so that my survey assistant could try to cut the tree down. This was a scary situation, as my survey assistant did not have any experience working with a chainsaw, nor did he have any experience working in northern Alberta in the bush. As he began to cut, the tree rolled off the stump and fell to the ground, I could avoid being hit by the falling tree. The rest of the story is long, and the rescue is even longer. Due to inadequate emergency response planning, poor communications, lack of training, no hazard identification plan with risk mitigation, and a green worker as an assistant, the rescue took over four hours to get me out of the bush and into the local hospital. I learned a lot that day. Today we provide training for all members of the survey team. Chainsaw falling is left to individuals who are certified fallers. We have daily tailgate safety meetings where we document hazards, rank each hazard in severity, and put control measures to eliminate or reduce each hazard and the associated risks.

I have had many more situations throughout the next thirty years. Still, it is more important to remember that during this time, everything has changed when it comes to the safety culture within the pipeline geomatics industry.

Andy Sytsema is a Geomatics Technologist who has worked in the Geomatics industry for close to forty years, and the last thirty years have been in the Pipeline Geomatics Industry. The opinions expressed here are his own.

Integrating Management Systems

By Akhilesh Manchanda, P.Eng., CMQ-OE



Adding Value by Integrating Management Systems

A White Paper with Red Marks

By Akhilesh Manchanda, P.Eng., CMQ-OE

Management Systems *focus*

ADDRESSING THE NEEDS TO CONCENTRATE ORGANIZATIONAL EFFORTS TO REALIZE SIGNIFICANT VALUE ADDITIONS BY INTEGRATING MANAGEMENT SYSTEMS.

The International Organization for Standardization or ISO (<https://www.iso.org/>) issued a directive that prescribes a high-level structure for Management System Standard (MSS) development, such as ISO 9001, ISO 14001, ISO 45001, & ISO 50001, with goals to enhance consistency, alignment, and compatibility of these ISO standards. Refer to Annex SL: Harmonized approach for management system standards at https://www.iso.org/sites/directives/current/consolidated/index.xhtml#_idTextAnchor535 for more info.

Many organizations are maintaining these international management systems in parallel and separately, sometimes in silos, and waste lot of resources by duplicating efforts to maintain individual management systems. As required by Canadian Energy Regulator Onshore Pipeline Regulations Section 6.1 (1) a company shall establish, implement, and maintain a management system that... The intent is to establish an effective, comprehensive, proactive system that integrates design, construction, commissioning, operations, and abandonment of pipelines that drives operational synergy and leadership accountability and delivers intended results.

INTEGRATING MANAGEMENT SYSTEMS (IMS)

What is an “Integrated Management System”?

While considering the entire business, an IMS combines all aspects of required systems into one overall comprehensive and harmonized management system to streamline and align valuable business processes to create significant synergies.

Why is “IMS” important for an organization?

In today’s world markets, key commodities such as oil & gas are volatile. Furthermore, unprecedented times, including COVID-19, have increased market uncertainty and it has become progressively more challenging to sustain a profitable business. Correspondingly, operational cost effectiveness, consistency and process optimization have become imperatives to organizational growth and sustainability. IMS aligns processes, minimizes duplications, reduces errors and assists organizations to achieve more with less.

KEY STEPS



1. Identify standards e.g., ISO 9001, 14001, 45001, 27001 that shall be considered by the team,
2. Analyze them for common requirements e.g., managing competency, documents, COTO, nonconformities, CA, PA, management review, internal audit, and management of change,
3. Prepare a business case for leadership review and commitment; communicate agreed direction,
4. Perform COTO, align vision, mission, values, policies, and objectives, may need to redefine these to support IMS; identify components of the management system, and define scope,
5. Secure commitment from internal stakeholders, plan to train resources to support IMS,
6. Develop IMS Framework, e.g., figure 1 and plan steps to deploy IMS, e.g., use Gantt’s chart,
7. Modernize, simplify, and merge documentation, and eliminate non-value adding documents,
8. Engage and apply systematic and structured approach to deploy IMS in cross functional areas,
9. Monitor progress, communicate and celebrate small successes, and improve as required.

COTO: Context of The Organization, CA: Corrective Action, PA: Proactive Action,



Getting the most from the Integrated Management System

Irrespective of size, sector or location, organizations could gain significant benefits by establishing one cohesive management system with a set of holistic documented information. Take this opportunity to eliminate non-value adding documents, simplify and modernize your documentation with new tools and methods.

Key Recommendations:

1. Present business case and assure buy-in from executive leadership on IMS.
2. Meet assertive functional leaders and explain what's in it for them.
3. Facilitate multiple sessions and workshops, and explain IMS benefits.
4. Discuss with people leaders, select competent personnel and form a self managed improvement team with clear roles and responsibilities.
5. Provide ongoing support, review progress and suggest improvements.
6. Communicate key results and accomplishments to the groups and executive leaders on a regular basis.

"An integrated, organization first, approach improves personnel engagement, consistency and transparency; it aligns the management system better with intended business imperatives."

AKHILESH MANCHANDA, P.ENG.,

Cautions:

1. You may face resistance to change e.g., we have been doing well so far, why do we need to merge management systems' components now? Be prepared to explain value, and what's in it for them.
2. Coordinate with functional leaders and be assertive to deploy IMS.
3. Avoid making decisions on behalf of functional groups.
4. You may come across some complex situations, engage leaders to address the situation.
5. Avoid changing everything at once, plan a structured approach to realize future state.

SMARTER IMS DEPLOYMENT



While modernizing documentation to deploy IMS, consider process and data automation by using digital transformation tools and techniques.

Figure 1. Integrated Management System Framework



Akhilesh Manchanda is a professional engineer registered with APEGA and an ASQ Certified Manager of Quality & Organizational Excellence. He serves as ASQ Canada's deputy regional director and is working with Midwest Pipelines Inc., and NAIT as CED Instructor. In this white paper, he shares his ideas and recommendations to assist quality management practitioners engaged in management systems development. He does not represent any insight from his employers. Akhilesh may be contacted through LinkedIn at: <https://www.linkedin.com/in/akhileshmanchanda/>



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Introduction to the Stress Analysis of Buried Pipelines

By Ralph Downing, P. Eng.,
President TRESCA Engineering Ltd

Except for a few locations such as stations, valve assemblies, and aerial crossings, pipelines are typically buried. Stress analysis of above-ground piping is generally well known in the industry, but buried portions' analysis is frequently less understood. This article briefly introduces some important aspects to consider for the buried portions.

The main issue that distinguishes the stress analysis of buried piping from above-ground piping is the interaction of the pipe with the surrounding soil. The soil tends to restrain longitudinal growth effects due to thermal expansion or stretch due to internal pressure. When the pipeline company installs pipe below the operating temperatures, typical for Northern Alberta, longitudinal compressive stresses can be induced in the pipe. When assessing the stresses in a pipe under compression, the combined effect of the hoop and longitudinal stresses should be considered, and this can be determined using the Tresca or von Mises approach. North American pipeline codes tend to use the Tresca approach due to its simplicity.



In addition to restraining longitudinal expansion, soils can move and generate stresses in the pipe. Some examples are soil settlement, movements on slopes, and frost heaving. In areas of seismic activity, the soil can also induce stresses as seismic waves move through the soil or at points of seismic faults. Also, buoyancy effects need to be considered if the pipeline is located where the water table is high and the soil is weak.

Many other effects can induce stresses on the pipe through the soil. (Refer to lists provided in CSA Z662 Clause 4.2.4 and Table O.1). One effect we tend to overlook is the weight effect of vehicles passing over the buried pipe, and such weight effects can occur at road and rail crossings or from heavy equipment at a construction site. Although it is rare, it is possible that repeated vehicle loading of the pipe at a crossing to cause fatigue failure at the girth weld of a pipe.

The nature of the soil around the pipe is an important consideration in determining the stresses in the buried pipe. For analysis purposes, soils are often classified as 'granular' or 'cohesive.' Coarse-grained soils, such as sand, are typically considered granular, and fine-grained soils, such as clay, generally are considered cohesive. Each type has a different capacity and different mechanisms for restraint. However, a possibly even more important consideration is whether the soil is 'disturbed' or 'undisturbed.' Disturbed soil has been recently 'dug up, in some way, and undisturbed soils may have been that way for millennia. As expected, disturbed soil is weaker than undisturbed soil. The backfill in a pipeline trench is disturbed soil, and it could take many years before it reaches the restraining strength comparable to the soil outside the ditch area. Therefore, a pipeline is more prone to longitudinal thermal expansion just after construction than it would be after many years.

Another grouping of soils is 'mineral' or 'organic.' Mineral soils are ground or weathered rocks, and examples are sand, silt, and clay. On the other hand, organic soils have a component of partly or fully decomposed plant material. Muskeg found in Northern Alberta is an example of organic soil, and it may contain mosses, lichens, or grasses and typically has high water content. The main concern with muskeg is its low strength compared to mineral soils. Poor pipeline restraint can result in excessive stresses at the bends and 'upheaval buckling' in long straight runs. Upheaval buckling could mean that the pipe penetrates the ground surface and buoyancy effects exacerbate its effect. Mitigation is typically necessary by such methods as screw anchors.

Finally, a software model of the pipe geometry and routing is typically developed to perform stress analysis of buried piping. The pipe steel and soil properties are added to this, and the relevant loads (weight, thermal expansion, internal pressure, soil movements, etc.) are applied. The computed stresses and strains are compared to acceptance criteria using the formulae provided in Clause 4 of Z662 or other approaches.

The above is a simplified discussion of buried pipeline stress analysis, and it should be noted that expertise in stress analysis or soil mechanics is normally required to perform it. Feel free to contact the above author at **ralph@tresca-eng.com** if you have any questions on the material presented. Also, we are specialists in piping and pipeline stress analysis and are available for project support.

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The Apex Software Story

By Robert B. Fookes, M.Sc., P.Eng.,
TriGem Technology Ltd. and
David Hermanson Sr.,
Principal/Founder Pipestone Projects Inc.

CHAPTER 1

Once upon a time, circumstance brought two people together working within the walls of now-defunct Colt Engineering. Bob was a newly-minted engineer



with a half-dozen years of software/systems engineering experience, and Dave was a seasoned pipeline surveyor/field engineer respected within the industry. Bob, a journeyman mechanic in his previous life, was always looking for new and challenging opportunities to put his engineering skills to work in a practical way to produce tangible results. With many years of experience in the field, Dave had a work history that included large

diameter, cross-country pipelines, major oil and gas facilities, and heavy civil infrastructure projects.

Colt, at that time, was struggling to put together a multi-spread pipeline estimate package in Excel. Colt assigned Bob to build a database system to solve this problem once and for all. And so, he did. The name of the solution was PiCES which is short for '**Pipeline Cost Estimating System,**' and the application icon was whimsically assigned after its astrological sign.



And so, PiCES, a simple pipeline estimating application, was born.

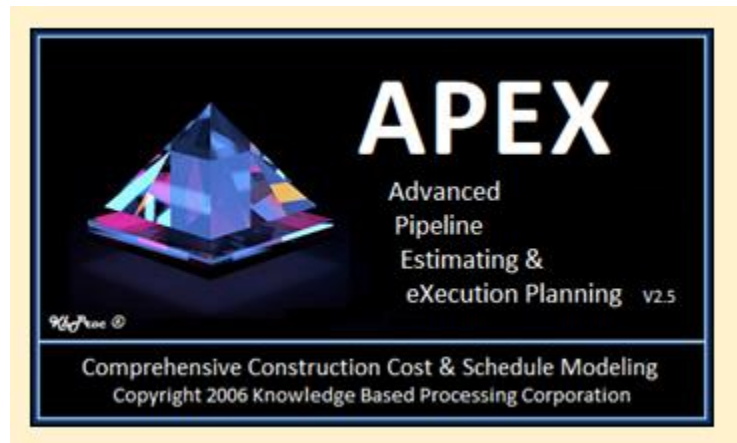
Dave had provided crucial input during the development phase a perspective Bob did not have at the time. It sometimes felt like fitting a square peg in a round hole for Dave. It was the beginning of a long relationship.

CHAPTER 2

Years later, after Bob had moved on to work other pipeline projects the original idea persisted and a more-complete product concept crystalized. Bob and Dave stayed in touch over the years, connecting for coffee to discuss anything and everything. Getting feedback from Dave on a potential new feature was always welcome. Enough talk, the time had arrived, the next step was to build it. For Bob the idea turned into an outright passion, and starting from scratch in 2006 using the latest technology a new software product commenced. New software architecture, stars aligned, everything in place, it was the natural evolution of PiCES.

Bob recalls vividly the day Dave passed along a brilliant suggestion from Dave Jr., the name APEX being the pinnacle – this was the vision. Bob flushed out the acronym, and '**Advanced Pipeline Estimating & eXecution Planning**' software was officially reborn.

A flashy splash screen and off Bob went building what had been slowly germinating for years. The process was organic, and the result was a powerful product specifically designed for pipeline construction estimating with functionality beyond its initial incarnation. Integrated 'What-If' analysis, Monte Carlo



simulation, and all manner of capability at your fingertips... As the marketing people reminded Bob and like to say, "Comprehensive construction cost & schedule modeling supports the development of budget cost data for pipeline construction projects. From start to finish and everything in between APEX is the solution."

Bob and Dave remained in touch as time went by, getting together whenever possible to catch up. The pipeline industry was dynamic, and there were exciting projects underway and many passionate people at work. Unquestionably a positive period, with so much promise and tremendous growth opportunity. Shortly after that, Dave created Pipestone Projects, and Bob continued developing APEX, adding new functionality and growing TriGem Technology.

CHAPTER 3

Initially, Bob used APEX to support various pipeline projects by providing services that naturally evolved into software licensing where the power of the



product was made available to others. Pipestone was an early adopter utilizing APEX for complex multi-spread projects. Bob is forever grateful for Dave's support over the years and feels privileged to have him as a friend. Over time APEX grew in capability and reputation, and with the Q1 2022 release of Version 2.5, the journey continues. When

people ask, "What is APEX?" Bob replies, "It's a Windows desktop application specifically designed for linear execution projects with everything stored in a database." The focus of the system has always been pipeline and features a consistent, repeatable calculation model and SQL Server data storage that ensures data integrity and high levels of performance. That's APEX!

CHAPTER 4

In April 2018, Petroglyph Project Analytics became the exclusive distributor of APEX, and TriGem Technology moved software development operations to the west coast. With feedback from users and ongoing support from Dave, Bob continues to improve the application with the long-term plan of **listening** to user feedback, **identifying** new features that enhance productivity, **building** upon the solid APEX foundation, and **nurturing** lasting relationships.

TO BE CONTINUED...

Is it time to leverage APEX on your pipeline project?

For APEX software licensing, contact Petroglyph Project Analytics.

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A Glimpse of Hydrostatic Pressure Testing of Canadian Underground Pipelines

**By Hiran Ganguli, P.Eng.
President of Piasha Pipelines**

Introduction

Hydrostatic pressure testing, or Hydrotesting, is a process where a liquid, primarily water, is used to pressure-test a steel pipeline for its strength and check for any leaks. Hydrostatic testing means the water remains static inside the pipe section during the test period. The test involves filling the pipe section with water, pressuring it to pre-calculated test pressures, and holding the test pressures for specified durations.

Hydrotesting is the most common method for testing new and existing pipelines to determine their integrity.

One can pressure test a pipeline with air, called Pneumatic Testing or Air Testing.

The physical hydrotesting of a pipeline requires several steps, whether the test is conducted in the summer or winter, and winter requires more due diligence and rigor.

Purpose

Pipeline hydrotesting can also be described as applying undue pressure (within limits) to determine if the pipe can withstand it. A pipeline is pressure-tested at pre-determined pressures before putting into service to:

- Prove integrity of the pipeline, including welds, to ensure the public's safety, environment, property, and employees.
- Validate due diligence of the pipe vendors ensuring materials supplied are good.
- Ensure the pipeline can be safely operated within the specified Maximum Operating Pressure (MOP).
- Ensure the pipeline is leak-free.

- Prove the workmanship of the pipeline contractor who built the pipeline, and finally,
- Comply with regulatory requirements, especially Canadian Standards Association (CSA) Z662-2019, Clause 8.1.2 states that piping shall be pressure tested after installation but before being put into operation.

Test Pressure Requirements

As per CSA Z662, Section 8 (Appendix 15), a new underground pipeline hydrotest will have to be divided into Strength and Leak Tests.

Strength Test

The strength Test is the first phase of the hydrotest. It tests the strength of the steel. It is a pressure test that confirms the pressure-retaining capability of the pipeline and establishes its maximum operating pressure. It is done by pressurizing the test section to a minimum pre-determined stress level or pressure and maintaining this stress level or pressure for a pre-determined time.

Minimum Value = 1.25 x MOP at High Point elevation.

Maximum value = 110% of SMYS at Low Point elevation.

The strength Test starts when the pressure pump is turned off after the pressure reaches Commencement Strength Test pressure, a value between Minimum and Maximum Calculated Strength Test pressures.

For new pipelines, the duration of the Strength Test is 4 hours minimum.

For existing pipelines, duration is specified by the company.

Leak Test

The Leak Test is the second phase and is done to find leaks in the pipeline.

For the fully visible pipeline during the test (such as above-ground testing), the Leak Test will be conducted by observing the test section while under pressure to check for a visible or audible leak.

For pipelines below ground or not visible, the Leak Test will monitor the pressure variations inside the test section throughout the test period, considering the effects of temperature and pressure on the test medium and pipe. In case of

a pressure loss during the test, the test crew will first correlate the pressure losses with temperature fluctuations or measurement errors.

They will further investigate and look for leaks in the pipeline.

Leak Test pressures are lower than the Strength Test pressures and are:

Minimum Value = 1.10 x MOP at High Point elevation.

Maximum value = 100% of SMYS at Low Point elevation.

It starts after the Strength Test is accepted. When the test section is depressurized and reaches Leak Test Commencement Test Pressure, a value lies between Minimum and Maximum Calculated Leak Test pressures.

For new pipelines, the duration of the Leak Test is 4 hours minimum.

For existing pipelines, duration is specified by the company.

Yield Plot

Clause 8.6.1 of CSA Z662-2019 (Appendix 15) states that:

“For liquid-medium testing, where the intended test pressure would produce a hoop stress equal to or greater than 100% of the SMYS of the pipe, a pressure-volume plot shall be made, starting at a pressure low enough to establish straight-line proportionality.” The Pressure-Volume plot, also known as Yield Plot, must be drawn simultaneously during the Strength Test and not after the test.

Once the Strength and Leak tests are approved and accepted by the pipeline company, the pipeline can be ready for Drying.

The pipeline company will have to submit all the test data to the regulators for approval before the company can put the pipeline in-service.

Piasha Pipelines offer a full-day certified course designed to train the participants in the pressure testing of Canadian pipelines. Through hands-on exercises, the students learn how to calculate hydrotest pressures based on CSA and NEB codes & standards, pressurizing, yield plotting, leak detection, and Test acceptance through a mock in-class hydrotesting exercise.

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Strategic Human Resources Management

By Mihaela Ciulei, P.Eng., PMP, M.Eng.

Strategic Human Resources Management became known in 2000. Dave Ulrich said that HR was ineffective and costly and needed to be redesigned to add more value and be more strategic. This meant that “HR strategy needed to better align with the business strategy to provide value.” HR became a support function for the business, managing the people as a resource. Now it is time to rethink this strategy to optimize business performance by correlating the company’s strategic goals with the employees.



Lorne Rubis has done excellent work in redesigning the HR Management strategy with “people first.” Lorne’s ten elements of the cultural framework help us “build and drive extraordinary cultures,” considering that “People are the source, not the resource.” The beauty of the IcE10 system is that it can be successfully applied by anyone, anywhere, top-down and bottom-up. People can use the ten elements integrated system to lead from where they are, create a positive impact, and create a better world.

Starbucks’ business model is an excellent example of how both the business and the employees thrive when people are considered the source. “Starbucks believes that its employees who they call partners are the key to Starbucks experience.” Starbucks CEO, Howard Schultz, refused the investors’ request to cut off the workers’ benefits to save costs. However, the business continued to prosper. This is proof that “people first and customer-obsessed” is the key to success. “Starbucks puts employees ahead of the shareholders in terms of priorities.” I used to be a client of Tim Hortons, but I have been so impressed with how Starbucks treats their employees that I became a Starbucks client and sent my friends and colleagues Starbucks gift cards on special occasions.

Recently I listened to a podcast entitled “Putting people back in human resources.” An HR Manager discussed “Humanly” versus “Humanely.” Currently, most organizations treat people humanely, including bathroom and lunch breaks, water fountains, vacation based on tenure, and bonuses- based on performance evaluation.

To optimize the profit and thrive in this competitive environment, the businesses need to redesign their processes and treat people “humanly,” addressing every people’s needs such as belonging, feeling appreciated, having opportunities to make meaningful contributions, working flexibility, etc. For instance, everyone needs to recharge, and therefore, the vacation time should not be based on tenure for optimum results.

Lorne Rubin’s podcast entitled “5 Principles for High-Performance Teams” really encouraged me. Lorne believes that the feeling of belonging is at the core of high-performance teams, and I agree with him. If the business strategy foundation is based on the concept that “the people are the source” and they feel they belong, then people contribute and go the extra mile because they want to, and the results are remarkable.

Lorne designed the Belongify System that connects and engages people from everywhere. There are five essential principles: connect before content, contribute, clarify, differentiate and advance. “Connect” is learning about each other, sharing stories, and building the bridges between us. “No one cares how much you know until they know how much you care.” We used to start our meetings with a safety moment at work and then discuss the agenda items. We have included a diversity story, and before discussing business, we connect. Each meeting attendee has the opportunity to introduce themselves and say something personal, such as how the day is going, what are the plans for the weekend, hobbies, exciting stories, etc. I noticed that people feel more connected and engaged. Removing institutional biases and intentionally adopting the diversity, equity, inclusion, and belonging culture, considerably increases the employee’s engagement and business profitability.

Psychological safety is essential to contributing and providing meaningful results. Suppose people feel safe to be sincere, admit mistakes, ask for help, and get the opportunity to grow by turning their weaknesses into strengths professionally. In that case, the organization will see tremendous benefits. I remember when a friend of mine was stressed because she was asked to do a task that she did not know how to do it. Her manager did not offer help. He said he expects her to do it because she is paid as an expert. Nobody should be expected to know everything. I think that a complex and challenging new task should be tackled in a team. This way, nobody’s confidence goes down, the problem gets the best solution, and people learn from each other. The “play and experiment” principle applies in this type of situation. As Amy Edmondson says, “silent organization is a dangerous organization.” People should not be afraid that

speaking up or a mistake will affect their job, salary increase, performance evaluation, or promotion. In jobs where a mistake has safety consequences, the organization should ensure proper training and procedures, double-check decisions, and take steps to mitigate people's fatigue. "Be hard on the process and never on people" creates trust and psychological safety.

For a business to survive and thrive in this competitive environment that is constantly changing quickly, the organizations need to differentiate themselves. "Psychological Safety is the unique differentiator of high performing teams." "People are the source" is the business foundation, and the HR strategy across the core HR Processes needs to be designed for belonging, growth, and results. The four leverage areas are engagement, reward, learning, and communication. Lorne's proposal to invite people to make this personal and leverage these areas with people and not for people helps the organizations create a system that enables success for both the business and the employees.

People like working with people who are accountable, committed, kind, reliable, get things done, and set clear expectations. As Brene Brown says, "Clarity is kindness." It is crucial to define clarity at every organizational, team, and individual level. One person can do a great job and add tremendous value or just do the job, and this depends on how clear this person is about the purpose of their role.

Advance is about learning fast and improving. Many organizations and people struggle with the time balance for finding time to do the job, train, learn and relearn. The Managers ask employees to be more efficient and prioritize activities until a certain point. It is critical to address this issue strategically, prioritizing the company culture and resources to create conditions for people to do the job and learn. Evaluating modern learning, the type of learning, and automating specific tasks help find time for advancing.

One day I was asked to think about how I would like my last day at work. I felt a lot about this. Having a system in place that offers people a positive memorable last day at work with wonderful memories about their journey will truly differentiate an organization. Designing a memorable last day for every employee enhances people engagement and talent attraction. I also love having a Company Alumni so that people who leave stay connected.

Creating conditions for work to be like a wonderful journey and not a competition inspires me. “Peer to Peer Power,” “Inspiring Purpose and Story” give satisfaction, well-being, and results, while the competition creates inner circles, silos, and health issues.

Many organizations see belonging as an outcome of inclusion, but this is not true. Belonging needs to be intentional.

“Leaders have to think about their obligation not just to get results, but how they might get results, so they optimize the contribution and build on the unique strength of every single person that makes up their team. And when they commit themselves to that, it takes on a different tone of behaviour.” -Lorne Rubis.

Mihaela has over 19 years of operations and project leadership experience, a history of building strong, cohesive teams and delivering exceptional result. Mihaela loves volunteering for the Community and Engineering Profession, advancing People and contributing to creating better work-places. Some of Mihaela’s professional highlights are leading the Canadian Power Infrastructure for the Line 3 Replacement Project, which is a multibillion dollars investment, actively participating in the developing of the Energy Management Diploma Program of the Norquest College and contributing to “Building a safe and resilient Alberta” through her work with APEGA. Mihaela’s research contribution in the reliability of the power systems is acknowledged in the Power Distribution System Reliability, Practical Methods and Applications Book, by Ali A. Chowdhury and Don O. Koval.

More about Mihaela’s activities can be found at:

www.linkedin.com/in/mihaela-ciulei-peng-pmp-meng-executive-mba-candidate-950b70a1

Pet Peeves Forum

Thank you for supporting our new pipeline magazine. We need your encouragement to move forward and improve our magazine.

Many readers suggested that we create a section for the **Pet Peeves** section (something that a person finds incredibly annoying), giving readers a platform to express their disappointment about some unacceptable industry behaviours.

One such pet peeve could be “**Ghosting**,” which means ‘someone stopping communication without explanation.’ For example, Ghosting could be when a prospective employer does not respond after a job interview.

If you wish, please share your experiences with us. We will review the write-ups and publish the stories having **solutions only** anonymously in our next issue.

Please send your write-ups to piashapipelines@gmail.com

Comedy Corner

✚ **God asks Chacko:** “Now that you are old, you have to choose either Parkinson’s disease (hand shivering) or Alzheimer’s (memory loss) as punishment for your sins in this life.”

Chacko goes to Thomas for advice. Thomas advises him to choose Parkinson and says, “It is better to spill half glass of whisky than to forget where the whisky is kept.”

Chacko hugs Thomas.

✚ **One night, A Doctor** Husband said to his Non-Doctor Wife: “You are not that ‘Great’ in bed anymore.”

The Wife kept mum. Then she went to the washroom and came out properly dressed to go out.

Husband: “Where are you going at this hour?”

Wife: “To Get a Second Opinion!”

✚ **A father of a church**, was conducting his anti-drinking campaign outside a bar.

A man came out of the Bar exuding alcohol fumes.

The father said, “tell me!!! son, if you arrive at the Gates of Heaven with your breath smelling of liquor... Do you think the Lord will let you in ???”

“My good father,” passionately holding his hand, said the man,

“You know, when I go to Heaven, I leave my breath behind.”

Pipeline Quiz

Q1. Pick the correct answer: On the Pipeline ROW,

- ✚ We strip first, then bend
- ✚ We bend first, then strip.

Q2. Pick the correct answer: Grading means,

- ✚ Marking pipeline inspectors' training course answers.
- ✚ Leveling the pipeline Right of Way.

Q3. Pick the correct answer: Shoefly means,

- ✚ An angry gesture of a pipeline foreman.
- ✚ A narrow road in the bush.

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We sincerely thank our contributors, reviewers, and advertisers for supporting our magazine. We hope to see you again in our future magazines.

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