LTAP History in an Oyster Shell

By Stephanie Cottrell, UNH Technology Transfer Center

In 1981, the US Dept. of Transportation and Related Agencies created the concept of Rural Technical Assistance Program (RTAP) as a response to South Dakota FHWA Division Office’s declaration of rural technical assistance needs. After a few bumps in the road between the US House of Representatives and the US Senate, they finally came to an agreement on funding details of this pilot program, passing the House Bill 4209 in December of 1981 which was signed into law by President Reagan on December 23rd of the same year.

In 1982, the FHWA and state DOTs pilot program began which included 10 different agencies and states, and was found to be a success. So with an effective pilot year in the books, more state centers were interested in joining the program. By 1985, twenty-six states were involved with the RTAP program.

1986 brought ten more participants, including the University of New Hampshire. This year also brought additional changes to the program concept and funding including the institution of a 50/50 match of federal funding with local funds.

Another milestone year for the RTAP program and transportation agencies was in 1991 when the Intermodal Surface Transportation Efficiency Act (ISTEA) scope of programming widened its support to include urban areas with populations over 50,000. The Rural Technical Assistance Program became the Local Technical Assistance Program (LTAP). Along with this change came the formation of the Tribal Technical Assistance Program to serve American Indian tribal governments.

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The UNH Technology Transfer Center (UNH T²) provides training and services to municipal employees, public and private road associations, and citizens, regarding new technologies and the management of roads and bridges. Established at UNH in 1986 by the Federal Local Technological Assistance Program (LTAP), the center is sponsored by the Federal Highway Administration, the N.H. Department of Transportation, the University of New Hampshire, and the national LTAP and TTAP Program.

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Call for Photos and Fond Memories!

We are in full swing here at the T² Center office, wrapping up the Spring session workshops and preparing for the next session’s calendar. As always, your input will help us to offer what is important and most pertinent to you.

Among the many balls we have in the air is a project to celebrate 30 years that the T² Center has been serving your municipalities and agencies. But it won’t happen without your help. Here’s what is needed…any photos, comments, fond memories of your experiences with us. If you took a great photo at your amazing job site, had an experience that reflected the knowledge you gained from one of our workshops, felt a moment that really encouraged, inspired or made you go “Wow!,” we want to know.

Send your messages and photos to me at the Center at stephanie.cottrell@unh.edu

What greater way to share our history and look forward to the future than to share your stories, your enthusiasm and continued support with your colleagues. Put on your shades, because the future looks bright!

Stephanie Cottrell
NH LTAP Training Coordinator
Technology Transfer Center

Memories are the key not to the past, but to the future.
Corrie Ten Boom

NH Construction Career Days, 2014. Helmet helpers
LTAP History

“A Study of the Benefits, Accomplishments, and Resource Needs of the Local Technical Assistance Program” was completed in 1994 and found that the average savings per state for one year, identified by locals through personal interview, was $1,331,014 and that the return on investment in 1993 was $8.53 for each dollar invested. Up to that time, LTAP centers had conducted 2,044 courses with an attendance of 58,300 people.

The LTAP grew from a budding concept to a full National Association and by 1998, the Transportation Equity Act for the 21st Century (TEA-21) reaffirmed the LTAP's role and commitment to serving its member communities. The National Association established formal agreements with AASHTO, APWA and NACE, increasing its ability to provide supportive assistance and programs to its members. The National Association and local LTAP centers have held steadfast since while continuing to meet the current needs of those whom are benefitting from the Program's trainings and to explore further valuable collaborations and programming demands.

New Hampshire’s LTAP Activities & Accomplishments:

Once the agreement for the establishment of an LTAP center in New Hampshire was signed in April of 1986, John Anderson, the first director, hit the ground running. The LTAP Center was formed under the umbrella of the Technology Transfer Center at UNH and has operated as such ever since.

The first workshop given by the UNH T2 Center was Pavement Management in May of the same year. Also part of the initial program requirements was to have the first issue of a newsletter submitted for approval by October 1st.

The NH LTAP program hosted the first contractor equipment show, Mountain of Demos, in 1987, which recently held its 29th show. UNH T2 Center was one of the first in the nation to introduce an award program for individual professional development through the LTAP, called the Roads Scholar program, as well as being one of the first centers to develop, circulate and support nationally a transportation infrastructure management software (Road Surface Management System – RSMS).

The UNH T2 Center was the first to host the National Local Technical Assistance Program Association’s (NLTAPA) website.

In 2015, the NH LTAP program at UNH’s Technology Transfer Center served over 1,100 people in the state. Municipal and state workers earned hours toward the Roads Scholar awards program, which is now considered a valuable asset to a Road Agent or Superintendent’s resume. More than half of New Hampshire’s municipalities, as well as 13 state agencies and 2 other states participated in its workshops last year, earning Roads Scholar hours.

The NH LTAP’s workshops are broken into four categories: technical, supervisory, safety, and environmental, covering topics from heavy equipment training to pavement preservation to supervisory concepts and everything in between. In addition to earning Roads Scholar hours, participants can now earn a Safety Champion award when they’ve completed 20 hours of safety workshops.

More than 7,000 separate individuals have taken at least one workshop with T2 since the program began,

1988 Newsletter, then called Transit Times (AKA Road Business).

An early example of the Roads Scholar certificate.
Managing the Life of Public Works Assets

By Kevin M. Ford, Ph.D., Solutions Engineer, Decision Lens, Arlington, Virginia;
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APWA Reporter, June 2015 issue

Public works professionals have been doing their jobs for many generations, stretching back long before the ancient civilizations of China, Egypt, Rome, and the Aztecs built their legacies. Over the centuries, we have learned a thing or two about how to develop and operate systems to serve our enterprises and improve our quality of life, but we still face the same problems: Things break or wear out. People’s expectations increase. Technology evolves. There’s never enough money.

What is different now is the colossal increase in our ability to capture, keep, and use information to increase our knowledge and support management decisions. It is not exactly news that we are living in an age of information, and it is turning out to be a game-changer for public works.

Consider the matter of service life of a traffic sign, culvert, water pipe, or bridge deck—really any public works asset. The life expectancy of that asset is a crucial factor when deciding about the asset’s design or purchase, its maintenance or rehabilitation, or its replacement. Public works assets face the end of life—as do we all—when wear and tear deteriorate their ability to perform at the level we require or our expectations change to render the asset obsolete. The actual end may come sooner if the resources are available to make a change, or may be deferred by “limping along” until the necessity for change becomes inescapable.

On one hand, people understand that complete failure of a public works asset—think bridge collapse or dam washout—can be disastrous. On the other hand, the work of maintaining the asset or replacing parts is expensive and often disruptive. Thinking ahead about when assets and their constituent parts are likely to reach the ends of their useful lives, actions that might be taken to extend the life or not, and the consequences of action or inaction is where information comes in. We are gradually replacing rules of thumb and guesswork with evidence-based information as a basis for estimating asset service life.

The National Cooperative Highway Research Program (NCHRP) has sponsored work that can help public works managers make better estimates and collect data to make their estimates even better. NCHRP Report 713 Estimating Life Expectancies of Highway Assets, published in two volumes in 2012, describes methods and available data that may be used for several types of highway assets. Some of these asset types are used in other areas of public works practice, and the tools and techniques are often transferable. Volume 1 of the report is a how-to-do-it guidebook; Volume 2 describes technical issues and data needs associated with estimating asset life expectancies and the practices used in a number of other fields—such as the energy and financial industries—to make such estimates.

Pay me now or pay me later!
Waiting until an asset fails can be expensive. Think about your car. Regular oil and filter changes are low-cost ways to significantly extend the life of a vehicle and hence delay the cost of replacement. Public works assets are not much different. Regular maintenance can effectively extend infrastructure life but at what point are we throwing good money after bad? Reliable life estimates are critical when evaluating preservation strategies to see which yields the biggest bang for the buck. Furthermore, life estimates can be used to compare the cost effectiveness of design and material alternatives, synchronize work packages, support project prioritization, allocate funds, and carry out asset valuation.

To come up with an estimate for infrastructure life, data-driven models can and have been developed to identify not only the typical lifespan of public works assets but also the most critical factors affecting that lifespan. Public works assets deteriorate with age due to accumulated effects of system usage and environmental conditions as influenced by their material, structural design, and repair history, among other factors. By knowing the likely culprits, public works officials can proactively mitigate risk and plan ahead for replacements under dynamically changing conditions.

Life is inherently uncertain
Recognizing that some assets will reach the end of their useful life quicker than others and conversely some assets will perform beyond expectations, asset managers must be prepared for anything. Rather than setting fixed replacement intervals, significant cost savings can be realized from a performance-based approach to decision-making triggering costly activities only when necessary. So how can we plan for the unknown?

The benefit of having data-driven models is that we can quickly assess the critical “what if’s?” What if assets deteriorate more quickly than normal? What if projects cost more than expected? What if we had more or less funding to maintain our infrastructure? By using even simple models to explore such uncertainties, public works managers can make decisions with greater confidence and
Knowledge management, whether in the public sector or in private industry, presents a challenge to every organization. We’ve heard the term “brain drain” before—the concept of human capital flight that will inevitably leave our agencies with the loss of skilled personnel. It’s possible that without proper planning, that in a very short period of time, both our people power and institutional knowledge can vanish from our workplace.

**They’re leaving**

Our perception may be that this phenomenon, this loss of experience and skill, just sort of happened while we were busy working. However busy we were, the need for creating and executing a knowledge management plan has been there all along. The impending doom of the gigantic Baby Boomer retirement exodus has been within sight for some time now. We’re actually moving beyond the Boomers leaving and faced with the Generation X flux, who are coming and going with much higher frequency than previous generations.

Furthermore, there is not only more transition in our workforce, but a broader disparity in the age of our employees. A recent article published on Forbes.com shines a spotlight on the fact that by the year 2020, five generations will be in the workplace. Five. That means we not only have to figure out what to do about knowledge management, but how to handle it with consideration to a slew of generational differences. The continuity of our work is reliant on being able to successfully transfer our agency processes, policies, practices, and history to new employees. Not just the younger employees, but those who are new to us for any variety of reasons. Focusing on only the “young” does not make sense—the trend for both Generation X and the Millennials is to be transient in their careers.

Recent surveys show a pattern in that both Generation X and the Millennials are likely to test the job market. Job satisfaction no longer guarantees employees stay put. Job stability appears to be less of an attraction to the younger generations, and they are more likely to make a move to find better benefits, promotional opportunities, or conditions perceived to lend themselves to a higher quality of life. One need not look any further than the Bureau of Labor Statistics to see why knowledge management should not be undervalued. The Silent Generation typically remained
Public Works Assets

develop contingency plans based on the likelihood of different events outside of our control. Having a good sense of what an asset’s service life will be can mean having the ability to say with some confidence that we will need, say, at least a certain amount of dollars to maintain an acceptable state-of-repair or level-of-service for the next five years.

Mining your own data

The tools and methods of service-life estimation are really only as good as the data upon which they rely. Data can be considered “good” in this case when it reflects all of the uncertainties and idiosyncrasies of a particular place and its public works infrastructure. By being able to explain why a public works asset is behaving the way it is, decision-makers can update predictive models to inform planning scenarios. As more information becomes available, the service-life estimates can become more robust, and that leads to more efficient business processes.

Blending economic evaluations with predictive models and expert judgments, public works officials have multiple tools they can use to strategically manage a wide range of physical assets. Having a data-driven decision process helps not only to identify the “right” projects but also helps bring all stakeholders into a productive conversation about what a community wants from its public works and what it can afford to do (or can’t afford not to!).


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LTAP History

The New Hampshire LTAP Center’s mission is to foster a safe, efficient, and environmentally sound surface transportation system by improving skills and increasing knowledge of the transportation workforce and decision makers. The Center is overseen by an advisory board consisting of professionals from the NHDOT, NH FHWA division, and municipal representatives.

The LTAP Advisory Board members are:

- Glenn Davison- Civil Engineer VI, NHDOT, Division of Project Development
- Nancy Mayville-Municipal Highways Engineer, Division of Project Development
- Christopher Tilley-Area Engineer, FHWA NH Division
- Martha Drukker-Assoc. Engineer, City of Concord, NH Public Works Assoc. Board Member
- Dave Danielson-President, Forecee Advocacy
- Richard Lee-Director of Public Works, Town of New London

For more information on the history of the LTAP program please visit http://www.nltapa.org/nltapa-history.

T2 Center’s fearless leader, Amy Begnoche, striking a pose at the 2016 Mountain of Demos, Newbury, NH
Installing culverts is a necessary part of most transportation projects, allowing water to pass under roads and other transportation infrastructure. However, when culverts create obstacles for fish and other aquatic life, the consequences can be serious.

“Culverts can create barriers in a stream network that fragment aquatic organism populations,” says Jessica Kozarek, a research associate at the University of Minnesota's St. Anthony Falls Laboratory (SAFL). “This leaves fish vulnerable to dying off by chance events and can lead to a longer-term loss of genetic diversity.”

To allow fish to pass through culverts, many are installed slightly below streambed level. The expectation is that sediment from the stream will be carried into the culvert, creating a consistent streambed. But does this strategy actually work? A new study from SAFL researchers reveals that it may not always achieve the desired results—and outlines new strategies for making culverts more fish-friendly.

To determine whether setting a culvert below the streambed was enough to enable aquatic organisms to pass through a culvert, researchers created several model streams in their laboratory that represented Minnesota streams with three different gradients, or slopes. Using these models, they tested the effectiveness of two installation methods: one in which the culvert was placed below the streambed but not filled with sediment and another in which the culvert was pre-filled with sediment.

“We found that pre-filling the culvert with sediment that replicates the streambed as part of the installation process helped prevent upstream erosion and the development of vertical drops that can become barriers to aquatic movement,” Kozarek says. “In addition, pre-filling the culvert helped ensure that the sediment remained inside the culvert when flows were high and when water moved quickly during rainstorms.”

For streams with steep slopes, researchers also found that adding structures such as steps, boulders, and riffles was critical to the stability of the sediment within the culvert. An experiment that used these structures inside the culvert showed that they helped stabilize the streambed upstream of the culvert.

Based on these experiments, the researchers developed design recommendations for embedded culverts where maintaining a natural streambed to preserve fish and other aquatic organism passage is a design goal. These recommendations include making the culvert as wide as the width of the stream when water levels are highest, analyzing each installation site to predict sediment movement into the culvert, pre-filling the culvert with sediment that matches the sediment in the existing streambed, and installing structures within the culvert for streams with steeper slopes to maintain sediment stability and provide resting places for fish traveling upstream.

“A lot of what was done in the past was not based on research; it was mostly just opinion. This study provides us with real data from testing in a lab setting to help us better design culverts,” says Petronella DeWall, MnDOT bridge waterway engineer. “Moving forward, MnDOT will be using these recommendations when designing culverts in environmentally sensitive areas.”
in an organization for more than a decade while Millennials are whittling down their length of tenure to about two years. A manager has to be savvy about training their employees, cross-training them when possible, and capturing that information knowledge of those who have retirement on the horizon in time.

Dr. Andrew M. Peña, Assistant Vice President for Human Resources at New Mexico State University, wrote an article titled “When Knowledge Left the Building” (www.workforce.com) where he discusses the need for having a succession plan not only for talent, but for the information that workers possess. He states that there are steps to be taken that can reduce the level of institutional knowledge lost when a skilled employee leaves. Specialized training, documentation of processes and job-sharing, combined with having a mentorship program in place, can help implement knowledge transfer.

Retaining institutional knowledge is a critical factor in retaining and recruiting employees, and the greater the skill needed (such as technological skills), the greater the threat. Turnover of employees is less important than the level and capacity of the employees who are leaving—if an employee’s skill set is not able to be replaced rapidly, the organization suffers that much more.

When faced with a potential for employees spanning four or five generations, it would be foolish not to give some consideration to the typical attributes of each. For example, Millennials are the most tech-savvy, and are also likely to want to work more independently than as part of a team. Generation Y is enthusiastic toward their jobs, but motivated by promotion. Generation X is the generation of managers and they tend to be more adaptable. Baby Boomers are often referred to as highly productive, with an interest in mentoring. So there you have it: a mixed bag of characteristics that when put together in a collaborative environment, will require some finessing on the part of management.

Self-preservation: What do we do now?
As a manager, we have come to grasp that our people could very well have sights on leaving. We do have some who will remain long term, and we would like to retain them. Now we know we must look at our agency and decide not only what should be included in our knowledge management plan, but how to ensure that we can transfer those components across generations. That requires a working knowledge of the characteristics of those generations and a very healthy understanding of how to keep talent and preserve information that will ensure our organization’s success.

You should conduct a workforce assessment of your organization, taking into account and recording what critical knowledge is held by the current employees. This could include working alongside those who are close to retirement for their input on what is critical to be passed on to others. Put them into a mentorship situation with more recent hires or those that are already identified to be their successors. A mentoring program is an excellent way to pair up employees and boost internal communications in an agency. Set forth clear goals for both parties and what your expectations are.

Observe how groups of employees interact with one another—what are the communications shortfalls that will not support knowledge transfer? Are there work processes that can be modified or technology to be adopted to support transitioning responsibilities from one employee to another? Employees must be integrated with one another. What is transformative across all generations that could boost our organization’s chances of prospering instead of suffering at the hand of workforce and institutional knowledge shortages? Have you inadvertently stereotyped generations of workers? Has this caused a generational divide that is now a barrier between employees, thus restricting a mentorship or trainer type relationship among a seasoned employee and a less experienced one?

Your mentoring program acts as active knowledge retention, and has some additional benefits. Participation often allows the new employee to develop skills and possibly acknowledgement of a career pathway, while simultaneously providing the veteran employee with a greater sense of value to the organization.
Brain Drain

Does your organization use a knowledge hub to centrally convene digital information? Having an intranet or shared server is another means of ensuring that important information does not vanish when an employee leaves. Maybe you have an electronic document management system or software for writing process manuals. Once a manager determines what types of digital recordkeeping should occur in this system, ensuring that it is complied with is important—the records will only be as useful as the quality of information entered into it. This is a way to show that your organization is innovative. You have identified what knowledge exists, and are providing a way to share it. Technology can be used to complement person-to-person knowledge transfer. The knowledge hub is a means to encourage knowledge retention culture in the organization, and can even be common templates that all employees use.

In our current human resource environment, all organizations must deal with the fluid mobility of a modern workforce. As employees come and go, we will be tested by how the institutional knowledge of long-term employees is maintained, and how quickly new hires can be brought up to speed on internal processes. Workforce assessments, knowledge hubs, specialized training, and other methods can all be utilized to streamline your company’s response to employee turnover. The loss of institutional knowledge never has to be a reality for a well-prepared organization.

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