

August 2018

# BACKSIGHTS & FORESIGHTS



Monuments by John Gale

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“One benefit of summer was that each day we had  
more light to read by.”

- Jeannette Walls

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*Backsights and Foresights* accepts advertising from equipment suppliers and others offering surveying related services. There is no charge for help wanted or positions wanted, employment ads or equipment for sale by practitioners whose main business is not equipment sales or rental.

### PUBLICATION DEADLINES

Material Cutoff	Publication
January 15	February 1
April 15	May 1
July 15	August 1
October 15	November 1

#### **Backsights and Foresights**

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Articles and columns appearing in the publication do not necessarily reflect the viewpoint of SDSPLS but are published as a service to its members, the general public and for the betterment of the surveying profession. No responsibility is assumed for errors, misquotes or deletions.

## DATES TO REMEMBER

### 2019 SDSPLS Annual Convention

January 9, 10 & 11, 2019

**(Wednesday, Thursday & Friday)**

Arrowwood (Cedar Shore) Resort

Chamberlain, SD

For reservations call: 1-888-697-6363

## \* TRIG-STAR \*

**SDSPLS 2018 Trig Star Winner**  
**Katherine Achbach (St. Thomas More)**  
**placed 8<sup>th</sup> in the NSPS National Contest.**

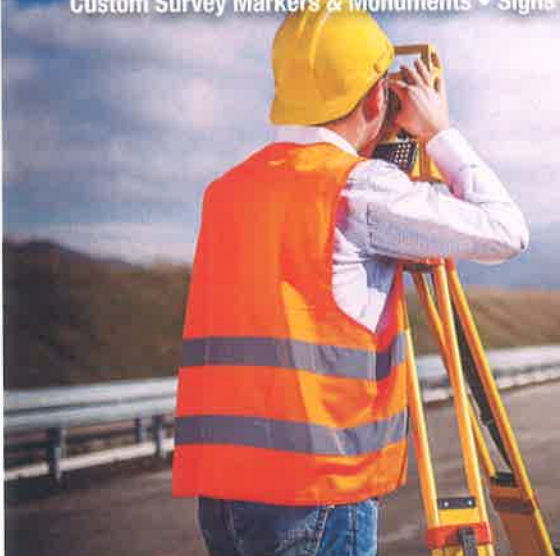


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BACKSIGHTS & FORESIGHTS

**SDSPLS – Board of Directors Conference Call**  
Monday, July 16, 2018

(This report subject to Board approval)

Participating: President Nathan Nielson, President-Elect Todd Schlunsen, Past President Fred Leetch, Secretary Jon Nelson, Treasurer Travis Kropuenske, NSPS Director Beau Koopal; Big Sioux Chapter Aaron Norman, Legislation Committee Gary Andersh, DPC Representative Don Jacobson and Executive Director Janelle Finck.

1. Meeting called to order at 8:11 am (central) by Past President Leetch.
2. Acceptance of Agenda: ++Motion by Kropuenske to approve the agenda as presented, 2<sup>nd</sup> by Koopal - Motion approved.
3. Secretary's Report – by Janelle Finck for Jon Nelson: Approval of minutes of the May 4, 2018 Board of Director's Meeting. ++Motion by Kropuenske to approve the minutes, 2<sup>nd</sup> by Norman - Motion approved.
4. Treasurer's Report – Travis Kropuenske: Written report submitted. Kropuenske reports funds were up due to additional fees. Leetch commented the 2018 Scholarship Auction income was \$7,370 and inquired about the historical average. Finck stated Scholarship Auction income average has been around \$7,500. ++Motion by Koopal to approve the Treasurer's Report, 2<sup>nd</sup> by Norman - Motion approved.
5. President's Report – Nathan Nielson: No report.
6. Committee Reports:
  - a) Education – Kristi Goehring: No report.
  - b) Legislation – Gary Andersh: Andersh stated the temporary licensure bill was defeated - thanks to the SDSPLS membership and DPC. General discussion regarding the candidates running for Governor and their stance on the temporary licensure. Finck indicated that nationally this issue is not going away and will come up again.
  - c) DPC – Don Jacobson: Jacobson indicated DPC has not been actively searching for an Executive Director and that he has been performing the duties temporarily. Leetch inquired about qualifications for the DPC Executive Director position and suggested candidates to contact to fill the position. Discussion regarding Architectural Society rejoining DPC - Jacobson to contact them to confirm their interest.
  - d) Professionalism & Practice – Dean Scott: No report.
  - e) Public Information – Mark Lippincott: No report.
  - f) Membership: Currently searching for a new Committee chair.

- g) NSPS – Beau Koopal: Koopal to send Executive Director his mid-year activity summary to be available for discussion at the next BOD meeting.
  - h) Trig Star – Steve Thingelstad: No report.
7. Chapter Reports
    - a) West River Chapter – Linda Foster: No report.
    - b) Big Sioux Chapter – Aaron Norman: Norman reports a Chapter meeting will take place in August - topics to include History of Surveying in Sioux Falls to be presented by senior Chapter members. The Chapter continues to support the Surveying class at Southeast Tech. The Chapter helped with 2 class field outings this spring with 2 additional class outings scheduled in the fall.
    - c) Missouri River Chapter – Keith Howe: No report.
  8. Old Business
    - a) Executive Director Search: President Nielson indicates Rebecca Dodds has accepted the position and will start this fall. General discussion regarding pay frequency and concerns Dodds had about certain language within the contract. Koopal to check on her concerns and provide signature sheet for contract amendments as necessary.
  9. New Business
    - a) NSPS Dues: Koopal reported the vote at the spring meeting to increase membership dues by \$10 per year. Most states have already accepted the rate increase. Koopal provided a letter from the NSPS President Kim Leavitt dated June 11, 2018 indicating the NSPS Executive Committee has approved the \$10 increase in yearly dues. General discussion pertaining to previous dues increases and concerns about loss of memberships in the SDSPLS due to the increase. SDSPLS approved a \$5 increase at its January meeting. The SDSPLS MOU will have to be amended to increase dues to just \$5 for 2019 and then \$10 in 2020-2025. Koopal to present the plan at October NSPS meeting. ++Motion by Leetch to approve, 2<sup>nd</sup> by Kropuenske – Motion approved.
    - b) 6<sup>th</sup> PM Monument Plaque: Jerry Penry of the NE is proposing restoration of the 6<sup>th</sup> PM plaque. The proposal proportionally splits the cost of replacement based on area of the 6<sup>th</sup> PM within the state. The SD portion would be \$400. Andersh to forward emails to Board of Directors.
  10. Next Meeting: Discussion regarding next BOD Meeting to include incoming Executive Director Rebecca Dodds tentatively set for Friday, October 12, 2018.
  11. Meeting adjourned at 9:09 am (central).

Respectfully Submitted

By: Jon Nelson – SDSPLS Secretary



# Replacement of NAD83

By: Jan Van Sickle, PhD, RPLS

NGS plans to replace NAD83 with a new semi-dynamic terrestrial reference frame (TRF) for North America. The implementation of the plan is currently scheduled for 2022. The interim period is intended to smooth the transition to the new paradigm (and completing of measurements critical to the creation of the new geopotential datum). The name of the portion of the new system is not yet certain but the portion that will be fixed to the North American tectonic plat may be called North American Terrestrial Reference Frame of 2022 (NATRF2022). One objective of the plan is the rectification of some long running discrepancies between the orientation of the TRF in North America and the space-based systems now used to realize it.

The orbits of GPS/GNSS satellite constellations are geocentric. The global reference frames ITRF2008, IGS08 and WGS84 (G1762) are also geocentric. Since GPS.GNSS is the dominant surveying utility worldwide the equivalent orientation of these reference frames makes sense. However, NAD83 is not geocentric. In fact, a comparison of NAD83 and ITRF88 three-dimensional coordinates revealed that the difference between their centers was more than 2.2 meters (~7 ft.). Nevertheless all realizations of NAD83 have been constructed on this same non-geocentric foundation. It follows, that NAD83 (2011) positions diverge systematically from any positions that rest on the geocentric reference frames. This positional difference is especially troublesome as the accuracy of so-called mapping grade GPS work done in WGS84 (G1762), a geocentric TRF, becomes more and more accurate. Soon inexpensive GPS/GNSS multi-constellation receivers will be capable of sub-meter accuracy without differential correction. The discrepancy of up to, and perhaps more than 2 meters (6.5 ft.) between NAD83 (2011) and WGS84 (G1762) will be troublesome and further exacerbated by some software products that still insist that NAD83 and WGS84 are equivalent, which has not been true since 1987.

The horizontal shift in meters from NAD83 (2011) epoch 2010.00 to ITRF 2008 epoch 2020.00 is probably representative of the shift that will occur in 2022 when the new TRF is implemented. That shift varies from approximately 0.7 meters (2.3 feet) to approximately 2.6 meters (8.5 feet) in the Continental United States, the largest shift being along the westernmost portion of California.

There will also be change in the public access to the new TRF. When implemented the new frames coordinates will primarily exist on active control rather than passive control. In the past, the official static coordinates published by the NGS were assumed to be

unchanging. The measurement systems available at the time created sufficiently reliable positions on passive monuments. Their constant slow movement was not apparent then because the errors in the measurement systems exceeded the extent of the motion. That is no longer the case.

Measurement technology has improved dramatically. It now reveals the persistent movement. This fact has diminished the reliability of the passive control monuments and makes it hard to justify the extraordinary resources that would be necessary to keep their coordinates up-to-date. As the current passive control network becomes unsuitable, in some instances, the new TRF may be directly available to users primarily via active control.

The new paradigm will also alter the roles and responsibilities that have long supported the NSRS. For many years the NGS has established and maintained the passive control network under the new plan that will end. That responsibility shifts onto the users. If users need passive control monuments they will need to set and tie them to the NSRS themselves, but such control will not be considered an official part of the NSRS.

NGS will continue to provide users with utilities to process their data, i.e. Online Positioning User Service (OPUS), will be augmented with new services including tools to transform their coordinates from NAD83 to the new TRF and tools to assign velocities to them. Currently NGS does not report motion on passive control. Users will know that when they have a velocity on passive marks they are working in the new reference frame and not in NAD83. When users know the movement of the monument in time they will have the option to adopt a specific epoch for their work if they wish. In other words, a user may choose to work in a non-dynamic system or, using the active control, work in the fully dynamic system.

These changes, i.e. a truly geocentric reference frame and the restriction of access to the reference frame through active control, will allow the NGS to reach their goals. Those goals include publishing CORS coordinates daily; continuous tracking changes in the active control network and supporting development of real-time networks.

The NGS is also working on a new vertical geopotential datum that will replace the North American Vertical Datum 1988, NAVD88.

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As seen in *The Texas Surveyor* March 2018



# Traveling on the Black and Yellow Trail

H.L. Kyes had one product to sell tourists, and that was getting from one place to another over the Black and Yellow Trail.

The Black and Yellow Trail grew out of a national good roads movement to improve roads for the benefit of residents, farmers and tourists. At that time, in the 1910s and 1920s, roads were bad and many were not joined together. Trail associations were established to mark, maintain, promote and seek funds to improve roads.

The Black and Yellow Trail was promoted by the Chicago, Black Hills and Yellowstone National Park Highway Association. The road went from Chicago, Ill., to the east entrance of Yellowstone National Park, passing through the middle of South Dakota. The association's national headquarters was in Huron. The Black and Yellow Trail was promoted as the shortest route and most scenic highway from Chicago to Yellowstone National Park.

The Aug. 21, 1913, Pierre Weekly Free Press reported that two pathfinder automobiles for the Black and Yellow Trail had arrived in Pierre. The gentlemen in the pathfinder automobiles had left Chicago on Aug. 12 to lay out a route between Chicago and Yellowstone National Park.

"During the most of the trip the roads have been excellent, and South Dakota's showing of good roads is reported by the pathfinders to be a very good one," reported the Pierre Weekly Free Press. "The people at every point visited have been very congenial, meeting the party with automobiles, banqueting them, and accompanying them to the next stop. There has been as many as forty automobiles in the party at one time, and the reception along the route of travel indicates that there is a keen interest in this part of the country in the Black and Yellow Trail."

The travelers from Chicago were met in Blunt by autos from Pierre and escorted to the capital city. In Deadwood, the pathfinder cars were greeted with dynamite bombs exploded from white rocks 500 feet above the city and a long string of autos from Deadwood and Lead.

Only the brave and hardy traveled the dirt trail until after World War I, according to John E. Miller in "Looking for History on Highway 14."

"The road over the so-called Black and Yellow Trail between Pierre and Rapid City is a joke as any tourist who has been over it will testify," read a July 13, 1917, letter by Elmer Juckett that appeared in the Hot Springs Weekly Star. The road between Fort Pierre and Philip was poorly marked and had never been graded, he

wrote, so it apparently was "but one single track or rut made by cars which every tourist must follow." The road from Wasta to Rapid City was rough.

As there were no numbered highways, symbols were used to mark a route to let travelers know they were on the right path. The mark of the Black and Yellow Trail was a yellow band about 10 inches wide between two black bands of about the same width. This mark was placed on telephone poles, boulders and other structures.

Towns along the route were encouraged to establish free campgrounds for tourists.

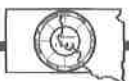
In 1923, Kyes was hired as the first full-time general manager of the Black and Yellow Trail. At the state meeting of the Black and Yellow Trail Association at Huron in January 1924, Kyes reported that the association had distributed more than 100,000 pieces of advertising during the past year. Programs were given in different trail towns by the Black and Yellow Entertainers. During the South Dakota State Fair in Huron, "Hagen and Her Black and Yellow Butterfly Girls" appeared twice each day before the grandstand.

At a session during the state meeting, South Dakota State Historian Doane Robinson encouraged delegates to have good markers along the trail in their communities emphasizing historic and scenic points, saying that tourists wanted to see all the country offers and didn't want to search for that information. The conclusion of Robinson's speech drew the most response from delegates. As stated in the association's minutes:

"Mr. Robinson suggested converting some of the massive Black Hills needles into statues of men connected with South Dakota history. While at first thought this would seem a lifetime undertaking it has been given serious thought and is entirely within the range of possibility. Incidentally, as put before the meeting by Mr. Robinson, it would take comparatively a very short time and the added tourist business during the time the work was in progress would bring many times the cost into the state and – the statues would be standing for generation after generation. Let's put it over."

Robinson's idea would become Mount Rushmore National Memorial and its carving and completion did, no doubt, increase traffic along the Black and Yellow Trail. Today much of the route of the Black and Yellow Trail in South Dakota is U.S. Highway 14 and is promoted by the South Dakota Department of Tourism as "genuine Americana."

*This moment in South Dakota history is provided by the South Dakota Historical Society Foundation, the nonprofit fundraising partner of the South Dakota State Historical Society. Find us on the web at [www.sdhsf.org](http://www.sdhsf.org). Contact us at [info@sdhsf.org](mailto:info@sdhsf.org) to submit a story idea.*



# Office Safety

**By: Joe Breaux, RPLS  
TSP Safety Committee Chair**

Surveying work is in the field, right? Well, not so much now, and for a long time. From my perspective it appears that at least one half of surveying work is done in the office, maybe even more. We often talk about safety in the field due to the numerous hazards that field crews so often encounter – potential accidents and injuries, snags, cuts, snake or varmint bites, insect bites, weather hazards, cold, heat, storms, etc. Add to that the hazards of driving to and from work sites as well as driving hazards on a job site.

From the most basic level, implementing safe work practices and techniques as well as training is not so different whether in the field or in the office. Maybe some of the dangers of the office are less than in the field, but, we just don't think of the office as calling for as much care of concern towards safe practices. After all, how can a setting where one sits in a chair, in a climate-controlled environment and completes most of their work on a computer or telephone be so dangerous? There is the ergonomics aspect of the repetitive tasks that computer use involves, but this is not the primary cause of office accidents and injuries. Safety for office personnel is just as important as for field staff.

According to the U.S. Department of Commerce, Office of Human Resources Management, the leading disabling accident types in an office setting are from falls (falls, slips & trips), strains and over exertions, falling objects, striking against objects, and being caught in or between objects.

The leading cause of accidents and injuries is from falls which account for a 2 to 2.5 times higher rate of injury than for non-office employees. Numerous hazards contribute to these types of injuries. Fortunately, many of these hazards can be significantly reduced or eliminated.

Falls, slips and trips are commonly caused by loose or torn carpeting; wet, hard surface floors with no mats; out of shape or curled mats, or cluttered pathway/halls. Eliminating or at least minimizing these hazards is the best solution. Be observant and pro-active. Clean up wet floors or spills immediately. Or report unsafe conditions to management or maintenance immediately. Don't leave a situation for someone else to attend to. I recently visited an orthopedic clinic where a curled floor mat was in the entry door. I know the condition was reported, yet on the next visit days later, the condition still existed. Not a good situation for the business or the patients.

Open drawers in file cabinets or desks, especially in common areas or hallways are a trip hazard as well as a striking or tipping hazard. Always be sure to close drawers immediately upon completion of your task of finding files or information. It only takes seconds to close that drawer and re-open it to replace the file again later, but those seconds saved to leave the drawer open are far overshadowed by the lingering effects (time and cost) of an injury received from tripping on or striking that open drawer left open.

Injuries from file cabinets tipping over can be very serious, too. Never open more than one drawer of a cabinet at one time, especially when using top drawers. The higher up an open drawer is in the file cabinet, the more leverage it applies to the cabinet and the greater the potential for tipping if multiple drawers are opened. Some file cabinets are built with interlock mechanisms that prevent opening more than one drawer at a time. But even if so equipped, practice safety by making it your habit to always limit to one drawer open at a time. Also, load the heaviest files or items in bottom drawers or on the bottom shelf whenever possible.

Stay clutter free. Tripping hazards are increased by stacking too many items in or near pathways. Never restrict walking space with too many boxes or items so large as to limit the space for walking. Tripping on these items or even the fall/tipping potential of them is a significant concern, but in the event of an emergency such as a fire situation, the risk of serious problems is far greater. Always limit clutter. Along the same lines, limit furniture placement so as not to restrict walking spaces or pathways, for the same reasons.

Electrical power cords / extension cords can be a tripping hazard as well as a fire hazard if not properly organized and adequately sized. Always place and keep power cords for computers and other electrical equipment bundled and secure on or against walls. This way a tripping hazard is reduced or eliminated. And never place a power cord or extension cord across walkways / pathways unless enclosed in a proper wire tray, one that completely encloses wires and cords and is designed so that it, too, is not a tripping hazard. An exposed power cord across a pathway is also subjected to unnecessary wear and tear when placed where it is stepped upon directly.

Safe stacking. Don't place heavy objects on top shelves or in top drawers of cabinets. The potential for injury or harm caused by heavy objects falling from a high shelf are too great. When it is necessary to retrieve something that is placed or stored higher than your reach, always use a ladder for climbing or a step stool for stepping up. Don't use chairs or other objects to stand upon. Chairs can be unstable when standing on a seat. And swivel chairs on rollers are totally unstable for standing upon to reach for objects. Even while seated in





a swivel chair they can be too unstable when bending and reaching for objects just beyond your reach.

Office settings usually don't involve lifting heavy loads. But strains and overexertion often result from improper lifting or carrying technique, even with small loads. Boxes of printer paper and computer equipment can be quite heavy or awkward and can strain or injure back or neck muscles. Before jumping in and taking on a lifting task that could cause injury, survey the situation (no pun intended) by first asking several questions. Is this too heavy for me alone? How high do I have to lift it? How far do I have to carry it? Do I feel it is beyond my ability, that I need help, and is someone available to assist? And then ask 'Am I trying to impress anyone?'

If you choose to lift the object, then be sure to use safe lifting steps.

- Place your feet at shoulder width apart, taking a balanced stance.
- Squat close to the load.
- Keep your back in a straight up or neutral position and tuck your chin keeping your neck in line with the line of your back.
- Grip with your entire hands, not just with fingers.
- Keep elbows close to your body, drawing the item close to you, keeping the load centered.
- Lift with your leg muscles, not your back muscles, keeping a neutral back position.
- Don't twist while lifting. If turning is necessary, turn your entire body, feet first.
- Never carry a load/object that blocks your vision.

If available, use a hand truck rather than lifting heavy objects. When setting the object down, reverse the procedure. Similar caution should also be exercised when moving furniture and most, if not all, of the suggested procedures also apply and should also be followed.

Striking objects is also a cause of office injuries. Always be cautious and alert to open drawers of desks and file cabinets, open cabinet doors, office machines, computers and monitors, and even other people walking. Bending and standing near these could result in a nasty bump or worse. Also be aware of standing or lingering in the path of a door that could suddenly swing open by someone coming from the other side.

Office staff can also be injured when fingers are caught in a door, drawer or window. Hair, loose clothing, scarves, ties and jewelry, and fingers and hands can be caught in office machines, too. Always use caution when working around anything with moving parts and even remove loose items that might be caught in machines before working around them. Copiers, printers and similar machines have numerous pinch points and often, hot surfaces. Use extra caution around these

machines and make sure that staff are trained in the proper use of them.

Falling objects also pose a danger in the office. Placing or storing items on top of tall cabinets or furniture should be avoided as there is danger of hitting or bumping the furniture or cabinet and causing these items to fall, possibly onto someone.

Supplies stacked precariously high or carelessly placed onto shelves can easily fall or be knocked down when reaching for nearby items. Store materials and supplies, especially loose ones, inside a storage cabinet or a file cabinet. Heavy objects placed on top of lighter ones can also be a falling hazard. Always place heavier items on the bottom of a stack, or on lower shelves. Heavy items or materials should also be placed where reaching over other items is not required.

A special word of caution about storing materials or placing furniture: fire extinguishers, fire equipment, sprinkler heads, fire alarms and smoke detectors should never be obstructed. Fire extinguishers should be visible and accessible. A minimum of 18 inches clearance should be maintained around all sprinkler heads.

An office setting is not thought of as a dangerous place. But as we've just reviewed, there are a number of situations that have the potential to cause injury and harm to workers in an office. Fortunately, many of these situations can be eliminated or greatly reduced by observing good safety practices and by being alert and observant. Stay alert to situations that may develop and take quick action to remove the hazard before it becomes a more serious one. An occasional, brief review of good office safety practices is not only easy, it is also an effective reminder to staff. Safety is everyone's job and should become our habit. Not because it is a written policy, but because it is best for all, even those who spend their time inside of an office.

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As seen in *The Texas Surveyor*, March 2018

*Every single one of us  
makes an impact on the planet  
every single day,  
and we get to choose  
what sort of impact that is.*

*- Jane Goodall -*



## Benefiting Members and the Surveying Profession

The National Society of Professional Surveyors has an active government affairs program that protects the interests of the surveying and mapping professions in the federal legislative and regulatory arenas. Working with a government affairs consultant, NSPS monitors federal government activities that may be of interest and concern to our members. The consultant works closely with members of the NSPS Government Affairs Committee and our Executive Director to represent members' interests before Congress and Executive Branch Agencies.

**Plus, we offer members these professional benefits:**

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- Political Action Committee Jefferson Club (*contact NSPS to learn more*)
- Assistance on state-specific matters
- Other geospatial organizations, such as the International Federation of Surveyors (FIG) and the Coalition of Geospatial Organizations (COGO)

### Education

- ABET-Lead Society for surveying/geomatics program evaluation for accreditation
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- NCEES – Participating Organizations Liaisons Council
- ALTA/NSPS Land Title Survey Requirements
- NSPS Model Standards





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- Listen to NSPS Radio Hour, Mondays at 11 a.m. EST: [americaswebradio.com](http://americaswebradio.com)
- Search for the "National Society of Professional Surveyors" on all of the major social media outlets:    

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# NCEES Task Force moves forward with considering restructure of PS exam.

**By: William (Bill) Karr, PS  
NCEES Surveying Exam Module  
Task Force Chair**

At the 2017 Annual Meeting, NCEES Member Licensing boards passed a motion to authorize the development of one or more depth modules to supplement the Principles and Practice of Surveying (PS) exam. The proposed modules would relate to the U.S. Public Land Survey System (PLSS) and/or the metes-and-bounds survey system. This long-term project is focused on ensuring that our exams continue to meet the needs of surveying licensure in all jurisdictions. The first step is to study the structure of the current PS exam and determine the best path forward. To this end, President Patrick Tami, P.L.S., formed the Surveying Exam Module Task Force for 2017-18.

The Surveying Exam Module Task Force met for the first time in Oklahoma City, Oklahoma, December 8-9. The committee is made up of representatives from all four zones and includes two member board administrators and representatives of both the public and private sectors of the surveying profession. President Tami attended as board liaison, and Davy McDowell, P.E., attended as staff liaison. Most, if not all, of the task force members have served or are currently serving on NCEES surveying exam development committees. My personal thanks go out to each attendee for the open, lively, and extremely pointed discussions during our two-day meeting.

Potential change to any NCEES policy of the *Bylaws* is often met with resistance. By nature, we are a deliberate and questioning organization, and changes to the format of an NCEES exam do not come easily. But as an organization, we have changed when necessary to better serve the member boards and the public we protect. The transition from free-response exams to multiple-choice exams and from pencil-and-paper exams to computer-based exams are good examples of such changes we've made as part of a slow and iterative process.

The main charge to the Surveying Exam Module Task Force is to evaluate the need for restructuring exams for surveying licensure. After a wide and free-ranging discussion on our first morning of work, the general consensus of the task force regarding this charge is a solid yes: the PS exam needs to be restructured. But how do we do that? And what will be the impact on our member boards, future examinees, and the public we are tasked to protect? Should the approach be a

modular exam of a multidivisional exam? What impact will a change in format have on jurisdictional-specific exams; can these be eliminated or, at a minimum, reduced in length? Will a modular or multidivisional exam have a positive or negative impact on exam takers from PLSS jurisdictions and non-PLSS jurisdictions?

In general terms, the task force does not think that jurisdictional exams will ever be completely eliminated. Having said that, we do think many of these exams can be significantly reduced in length if the content of the exam includes only jurisdictional-specific items. We have heard from some PLSS jurisdictions that they include additional PLSS items on their jurisdictional-specific exams because they feel that the NCEES exam is lacking in these types of questions. The task force feels this is an accurate assessment. But why should an examinee from Vermont (a non-PLSS jurisdiction) be required to know the intricacies of the PLSS if they never plan to practice in a PLSS jurisdiction?

To help address this concern, NCEES could, for example, have a breadth module that covers aspects of surveying common to all jurisdictions, which all PS examinees would be required to take. This would give NCEES the flexibility to create a variety of depth modules to be used by the PLSS or non-PLSS jurisdictions. This approach would also help member boards that would like to license GIS or photogrammetry applicants, with NCEES creating depth modules in those specific areas. Similar breadth-and-depth modules are used for the Principles and Practice of Engineering Civil exam.

Or NCEES could develop a multidivisional exam. Unlike modular exams, which are scored as one unit, multidivisional exams have separate divisions that are each scored separately. These divisions can be organized around different content areas, and boards could specify which divisions are needed for licensure in their respective jurisdiction. The profession of architecture currently uses a multidivisional exam; the Architect Registration Exam has six separately scored divisions organized around the progression of an architectural project. The NCEES Structural Engineering (SE) exam is also multidivisional, albeit with only two divisions: vertical forces and lateral forces. These sections are taken and scored separately, but both are required to pass the SE exam. There is a common section for each division, and the examinees can then focus on buildings or bridges for the second section.

These are only a few of the ideas the task force is exploring. To help in our deliberations, we developed a survey for member board administrators. This questionnaire was sent in mid-December. We reviewed the responses at our January task force meeting and are developing recommendations to present to the Council

*(Continued on page 17)*



# Reminisce of an Old Surveyor (Part I)

## Measuring a Distance By Taping

By Knud E. Hermansen, P.L.S., P.E., Ph.D., Esq.

I don't like to think of myself as old but I am. I have been surveying for close to 50 years. The difference between how I used to survey and how surveying is done now is different. This difference was brought to the forefront of my thinking one day when I was surveying with a young surveyor. As we compared the distance we measured between two corner monuments to the distance set forth in the original survey performed in 1968, the young surveyor was appalled that the original surveyor was off six tenths of a foot between the two monuments. Until this young surveyor spoke I was thinking that the 1968 surveyor had done some exceedingly good measuring given the fact that the distance between the monuments was almost 2,000 feet across uneven landscape filled with puckerbrush. My young associate had never used a tape to measure a long distance. Had he done so, I think that he too would have marveled at the accuracy of the 1968 surveyor.

I would be surprised to hear that any surveying firm operating at this time still tapes long distances. If there is some firm that still practices this ancient art, surely they cannot compete on a fee basis with another firm. So my young colleagues in the profession will better understand how the boundary they are now retracing was measured, I will reminisce about the lost art of taping a long distance.

Taping required at least two people in the survey crew. Three were ideal, with a person on each end of the tape and one person on the instrument to keep the two people on a straight line between the end points.

My employers at the time were somewhat tight-fisted with expenses so most of my taping was done with one other person.

With the direction to be measured selected, a distant object was chosen to use as a point of reference to guide us while taping. I suppose when taping across open land, a pole was included as part of the survey equipment. The pole was placed in the ground on line with the direction to be taped and used to guide the taping crew. Where I surveyed there was always some natural object that could be used or an appendage of a tree or bush where ribbon could be hung to serve as a guiding point.

Unless we were in farmland or urban land there followed some physical labor as brush and other vegetation was cut and removed from the direction to be taped. Of course if the distance to be taped was part of a traverse, the direction of the traverse was often selected so as to avoid the denser portions of vegetation thereby saving a great deal of physical labor involved with cutting a traverse line. If memory serves me, I seem to remember more time spent cutting to a clear a line in preparation to taping the distance than actually measuring the line.

My employer favored a 200 foot steel tape. Most surveyors employed the standard 100 foot steel tape. I heard of a few surveyors that employed a 300 foot steel tape. The longer tape meant fewer markings on the ground that I shall explain later. However, the longer tape made a wicked sag unless extra tension could be exerted on the ends of the tape to reduce the sag. Of course the extra tension made plumbing the tape more difficult. Still, I came to appreciate the longer tape and used it when I first practiced on my own after becoming licensed.

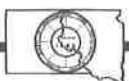
Now I will say here and now that I was well familiar with tape corrections such as sag, tension, and temperature. We never made those corrections nor do I remember a surveyor that I met at this time that did so though they were common subjects in academic learning. I do not believe these calculations were omitted from ignorance. It must be remembered that calculations during these times were done without benefit of an electronic calculator. As a result, any calculations involving multiplication and division were a tedious undertaking.

Also, the errors associated with the failure to make tape corrections were often as not dwarfed by other factors present in the boundary survey. Would a temperature or sag correction to the steel tape make much of a difference when the corner monument was a 22 inch diameter tree or a three foot diameter stone pile?

My employer did deem it important that the taping be done on a straight line and as near to horizontal as possible unless the end of the tape could be placed at the instrument allowing a vertical angle to be read and used to reduce the slope distance to a horizontal distance. I do not remember ever employing a hand level to check to insure the tape was horizontal, the level of the tape being accomplished by a fair estimate with the eye.

Leveling the tape required a plumb bob be suspended from at least one end of the tape and usually at both ends of the tape. Even on relatively level ground it was necessary to suspend the tape above the ground and employ plumb bobs or else the tape would weave up and down over brush we had cut, fallen trees, stones,

*(Continued on Page 14)*



and high grass that was normally present on the line of taping.

I don't believe a plumb bob can be found among the equipment of the modern surveyor. Perhaps it may be found buried in the equipment box on the survey truck yet. The plumb bob does not hang from the belt of the surveyor like it did decades ago. To come to the field without a plumb bob was a serious omission – akin to forgetting the tripod. Not only was the plumb bob necessary for taping but it was a necessary piece of equipment to hang under the tripod in order to place the instrument over the point, the optical plummet not being present on transits and compasses that were used to measure directions at that time.

Beginning at the instrument, the tape was laid out in the direction to be measured. Perhaps laid out is the wrong word - for the procedure was to grab the 'zero' end of the tape and drag it in the direction to be measured until the rear tape person would yell "stop" or some other recognizable command. Now in doing this simple task it was important that someone watch the tape or at least be sensitive to the resistance to the drag offered by the tape to prevent the tape from looping upon itself where continued tension would cause the loop to collapse and the steel tape to break. Careful observation was especially important when turning the tape back upon itself. Breaking a tape would cause the ire of even the most placid employer because there was no reason for this event to occur but for negligence. I am sure some survey crew members did try their best to think of some other plausible excuse that would explain a broken tape and not attach blame to themselves.

Having dragged the tape to its farthest extent without causing the tape to break, the forward tape person would be directed to the right or left by the rear tape person so as to cause the forward tape person to be on a straight line between the two points where the distance was required. This is where the pole or point of reference spoken of earlier assists the taping crew.

More times than not it seemed this simple task would reveal that the forward tape person had passed on the wrong side of a tree or bush requiring the forward tape person to drag the tape back to the offending tree or bush and pass on the correct side of this transgressing vegetation. Surely if the tape did not kink or break in laying the tape out, the risk of a break by kinking the tape increased with this realignment because the forward tape person was looping the tape back upon itself and was now agitated with the extra effort necessary to make the measurement. In their frustration they would tend to pull on the tape harder than good practice should allow.

In some instances, it would be determined that rather than drag the tape back and go on the other side of the offending vegetation, the vegetation could be cut and removed. This idea was good in theory but often fraught in practice. More than once I have seen a good swing of the machete or brush hook designed to cut the offending brush not only cut the brush but go on to cut the tape as well, the tape being next to the offending brush because of the circumstances I have mentioned.

It was always a discussion among survey crew members whether the employer will think the intelligence of an employee to be less if they broke the tape with an overlooked kink or the result of a powerful stroke of a machete. Thankfully that is one conversation and confession that will no longer occur with modern survey practice.

Once satisfied the tape is aligned properly in the direction of the survey, the tape would be raised off the ground in a manner to effectuate a level line. In raising the tape, the taping party often discovers that the recent maneuvering with the tape has allowed the tape to seep under some brush that had been previously cut in clearing the line and allowed to remain in the vicinity. The discovery of the offending vegetation occurred when an effort is made to raise the tape and one or more pieces of brush would also rise with the tape. At this discovery some vigorous attempt is made at shaking the tape to throw off the offending brush. This effort seldom worked other than to jerk the end of the tape out of a person's hand.

With the failure of shaking the brush off, it became necessary for someone to once again walk along the length of the tape and remove offending pieces of brush that had found their way to laying on the tape rather than under the tape.

If a person is following this story and is counting the trips along a particular segment of line, they will realize that the distance of the tape has probably been walked three or four times. First, a person must walk the line to cut a clear sight along the line. Second, a person will walk the line to drag the tape to set up the measurement. The third walk occurs when retracing the steps in order to come back around the correct side of a tree. Finally, the fourth walk of the line is to throw off brush and vegetation that has climbed on the tape. I know that vegetation can't move or climb on its own but if you had been there you would swear it does just that.

Finally, the tape could now be raised off the ground to effectuate as near as possible a horizontal line that could never be a straight and level line since the weight of the steel tape always caused a sag. To remove some of the offending sag, tension had to be applied to the ends of the tape. I suppose there were surveyors who employed tension handles in the field that allowed the tension, measured in pounds, to be carefully applied to the tape's



length but I have never met the field crew that used them in the field doing a boundary retracement survey. Perhaps a diligent survey firm would have had at least one tension handle in their office in order to show a new employee what 15 to 20 pounds of tension felt like.

For those surveyors who have never seen a tension handle, a close similarity can be visualized by thinking of certain weight scales with a handle at one end and a hook at the other end that are sold to fisherman to weigh the trophy fish they plan to catch. I suspect that some of the survey tension handles that were purchased by surveyors were used more often for weighing fish rather than applying tension on a tape.

With the tape raised off the ground, great skill must now be employed to do several tasks at once. The tape person had to keep the tape level, at a consistent tension, and steady enough to fix a point on the ground using a suspended plumb bob.

The rendition of these tasks in print does not begin to describe the difficulty of combining these tasks in practice. First, the plumb bob string must remain fixed and immovable on a mark found on the tape. This requires one hand be employed to clamp the plumb bob string securely to a mark etched on the steel tape. The other hand is employed pulling on the end of the tape to keep a constant and desired tension. It must be remembered that the steel tape is a smooth ribbon but for some minor roughness caused by marks on the tape surface indicating feet, tenths, and hundredths of a foot. The last two mentioned etchings only present at the ends of the tape. The combination of the tension, tape smoothness, and liberal sweat on the hands resulting from the physical labor involve in surveying at the time and the reader can deduce the challenge required in making a measurement while exerting tension on the tape. Usually a leather thong at the end of the tape was used rather than holding the tape itself. A consistent tension was employed by tucking the hand next to the body and leaning the body in the direction away from the other person in order to render the desired tension.

Where a leather thong was not present or 'breaking the tape' required, often as not the tape person would grab hold of the tape and bend the tape down at their hand to afford a better grip – much as a person would do when pulling a rope to get a better grip. This grip often left a 'jog' in the tape at the completion of the measurement. After years of usage, a tape would no longer lay flat but would have rises and dips along its length that would be coupled with a few points of extra thickness where the tape had been repaired.

Let me pause in my rendition of taping to state that when I speak of 'breaking the tape' in this instance, I am not speaking of physically breaking the tape. Rather the phrase was used to indicate the entire length of the tape was not to be employed in making the measurement

required.

Long ago, some entrepreneur invented a tape clamp. The tape clamp was a handy little gadget that allowed the user to firmly secure the tape with the clamp using the two finger rings that were part of the clamp. Using the finger rings, the tape could be easily pulled without bending of the tape or permitting a slippage along the tape.

I doubt much money was made from the invention. The survey firms that had purchased this gadget were likely as not to leave it unused in the office. When brought to the field, it never seemed to be with the tape person who needed it.

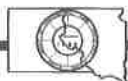
Having mastered the combination of holding the tape level, keeping pressure on the tape, and keeping the plumb bob string firmly attached to a mark along the tape, the tape person could now focus their attention to the suspended plumb bob that was likely as not swinging over the ground much as a lookout does in a crow's nest over a ship in rough seas. Restraining the plumb bob from wild gyrations required the tape person to periodically tap the plumb bob into the ground until the swinging of the plumb bob settled down.

The person at the rear of the tape had a mark that the plumb bob had to be over. When he was satisfied that he had wrestled the plumb bob and by extension the appropriate part of the steel tape over this point he would repeatedly shout some agreed upon term to the forward tape person to let that person know that a measurement could now be reliably made by the forward tape person.

I have seen the patience of the rear tape person sorely tested by the inability of the lead tape person to make a timely mark or reading. The rear tape person will make repeated statements of "good" or "mark" to indicate that he is over the point and the measurement can be made. After some repetition, the rear tape person will become agitated by his own endless repetition and may be heard to stop the repetition in order to yell: "god damn it, I'm good at this end. What is taking so damn long?"

If the forward tape person was not measuring to a previously established point, they would tap the plumb bob point onto the ground to make a mark in the dirt, having previously kicked away grass, leaves, and twigs to clear a space on the ground. Once the forward tape person was satisfied the mark made by the plumb bob point represented a fair measurement, they would release the tension in the tape and put a pin into the ground at the mark. This pin would become the basis for the rear tape person to advance upon and measure over.

*(Continued on Page 16)*



As I previously mentioned my employer was a kindly man but did not feel justified in purchasing equipment that was not absolutely necessary. Rather than using chaining pins, as they were commonly known, to fix the limit of the tape measurement, we would use nails or sticks with flagging tied to the end of the stick.

Having marked the length of the tape on the ground, the forward person would drag the tape in the direction of the survey to begin again the process of making the next measurement. The rear tape person would follow with the other end of the tape. Now if the rear tape person was not paying attention, they would likely as not kick the pin or nail out of the ground before they spotted it. If the rear tape person did a good job of kicking the pin loose from the ground, the taping would have to begin anew back at the starting point with numerous expletives used against the rear tape person for not paying attention to where they placed their feet. To avoid repeating the process of taping or bringing upon themselves embarrassment and attracting the ire of the other crew members, more than one rear tape person made a best guess where the pin may have resided before they inadvertently kicked it out. If possible the misfeasance was corrected without the forward tape person realizing what was being done.

I should mention that had the forward tape person measured into a mark or corner already fixed, his job was a little more difficult. Rather than stick a pin, nail, or stick in the ground, he had to find a way to maintain the tension, keep the tape horizontal, maintain a steady plumb bob over the point, and read the marks on the tape at the plumb bob string.

This was done by firmly clasping the plumb bob string over and on the tape using the index finger and thumb and sliding the string along the tape until the plumb bob was over the desired point. The tension was then released while still keeping a firm grasp of the string on the tape. Once all the other distractions were eliminated, the forward tape person could peek under his thumb and see what incremental hundredths of a foot mark the string was held upon.

At this point it is worth mentioning a problem that has plagued surveyors using a tape or chain for a couple of centuries – keeping track of the whole lengths that are used when measuring between two points. When a survey crew measures long distances, it is necessary to tally the number of full tape lengths used. Now it would be wise for a crew member to make a mark in a field book each time a tape length is achieved. What is wise, and what was done are two different things. If field books were not available putting notches on a stick or moving stones or acorns from one pocket to another was employed. Despite the best efforts, there are numerous distances where a tally was lost or added that should not

have been.

I have alluded to a plumb bob suspended from the tape to the ground. The term 'suspended' is only accurate after some effort is obtained to stop the plumb bob from swinging in arcs over the ground. It is not possible to get a plumb bob to hang from the tape to the ground without some swinging. The plumb bob was determined to be contrary when let loose to hang. There were times when the plumb bob was stationary but not vertical as in the case when the plumb bob had to be dropped from chest height and there was a strong wind blowing across the open field. It seems to me that the wind was usually combined with cold temperatures. To all the other problems I have alluded to in trying to keep the plumb bob steady over a mark must be added the lost sensitivity of the fingers when using gloves and the shaking of the body from the cold temperature.

Eventually, the plumb bob was finally settled into compliance by tapping the plumb bob upon the ground until the tip of the plumb bob was confined to a small area meeting the tolerance of the tape person. Of course before the tapping could take place, the forward tape person usually had to expose the ground by kicking away sod, sticks, leaves, and other debris using the toe of his boot. This often accounted for the delay that caused the agitation of the rear tape person that I have previously mentioned.

I must not close this reminisce on taping before adding a few more tidbits that provide some added insight into taping practice.

Many tapes were not marked or inscribed like a more recent steel tape or the fiberglass tape still found in the surveyor's tool kit. What I mean is the tape did not contain marks to the hundredth of a foot along the entire length of the tape. The old tapes were only marked every foot except for the very end of the tape where the tenths and hundredth of a foot marks could be found. This necessitated the rear tape person find a whole foot mark to hold to and the forward tape person use the end of the tape to measure the increments of a foot. To set this up involved the forward tape person yelling back to the rear tape person to 'take a foot' or 'give a foot.'

While on the subject of marks on the tape, I must state that dragging a tape along the ground for days, weeks, and years often succeeded in smoothing the tape and erasing the stampings of the whole feet and making the marking of whole feet difficult to read. More than once I had to look up or down the tape to find a readable mark and work my way back to the mark I was to hold at in order to know what whole foot I was holding at.

I have about exhausted my memory of taping but for three situations often encountered in taping. One situation is the delicate taping required when taping





through an electrified cow fence with a steel tape. I need say no more on that topic as the reader can well imagine what often happened. I must add that in addition to the electrified wire, once the survey crew has cleared the electric fence and entered the field, the reason for the electrified wire becomes obvious. Curious cows tend to congregate about the surveyor and become a hindrance in the taping process. However, I suppose a curious cow or heifer is far better than the bulls I encountered from time to time that took offense at the red often worn by the surveyor.

The second situation not fondly remembered is taping upon a concrete or asphalt surface. Since such surfaces were often flat and without obstructions, the tape was laid flat on the surface. Tension was put on the tape ends during the measurement with knuckles touching the asphalt or concrete. In such cases one tape person usually released their tension unexpectedly with the result that the other tape person often left some skin from their fingers on the rough surface of concrete or asphalt.

The third situation that still can incite bad dreams occurred when taping across a busy road or sidewalk. You did not have to experience this situation in order to imagine the peril of a tape suspended above the road surface when a car is observed much too late traveling down the road. Dropping the tape quickly to the road surface would often preserve the tape. Yet, there is many a time the survey crew returning to the office with a broken tape that claimed this very event to be the cause of the broken tape. Of course, there was nothing they could have done to prevent this happening. At least that is what they claimed.

I will close this reminisce by speaking about securing the equipment used in taping. The tape was coiled with attention paid to making consistent sized loops. The tape was then thrown. I don't mean heaved to the side. I mean that the tape was made into a figure 8 then into a compact circled loop using a twisting of the hands. Throwing a tape was an art that was often done at a surveyor's convention to show prowess. If a person did not know how to throw a tape it turned into a wrestling match where the tape refused to cooperate and often as not ended in a jumble rivaling any fishing line tangle. If the person did know how to throw the tape, a person watching would have the unmistakable impression that a magic trick just occurred. One minute the tape is in a large loop and the next it is neatly coiled in a compact loop.

The other item of equipment deserving some effort at storage was the plumb bob. To see a plumb bob being stored with the string hanging loosely from the end of the plumb bob would reflect poorly on the owner. At some point, another inventor came up with a gammon reel that wound the string up unless the owner resisted the urge of the gammon reel. Before the gammon reel arrived at

the scene, a plumb bob string would be carefully wrapped around the head of the plumb bob and a slip put into the string to hold the string in place.

A careful tug on the string would unwrap the string from the plumb bob. A knot in the plumb bob string spoke of an untrained crew person. A knot in a plumb bob string was akin to a hang nail on the finger – its presence always felt and always hanging up at inopportune times.

Keep this rendition of the taping process in mind young surveyor before disparaging that old surveyor who taped those long distance one small segment at a time.

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*As seen in The TBM Newsletter of the NHLSA, August 2018 and reprinted with the permission of the author.*

*It requires a better type  
of mind to seek out and to  
support or to create the new  
than to follow the worn  
paths of accepted success.*

*- John D. Rockefeller Sr. -*

**(NCEES Task Force – continued from Page 12)**

at the four upcoming zone interim meetings this spring.

The task force may reach out to member board administrators for further assistance as the study progresses.

Many aspects need to be considered, and different viewpoints make that consideration more fruitful. If you have questions or comments, please contact me at [wkarr@sidlockgroup.com](mailto:wkarr@sidlockgroup.com)

*Karr is a past president of NCEES, chair of the 2017-18 Surveying Exam Module Task Force, and a PS exam development volunteer. He is also a former member of the Michigan State Board of Professional Surveyors.*

*As seen in NCEES Licensure Exchange February 2018*





In recognition that in today's technological world it is critical to inform youngsters at an early age about career choices, NSPS has partnered with Elaine Ball Marketing to become the North American Distributor of posters she has developed as a great way to introduce/promote surveying to kids. NSPS is also a sponsor of the poster, and has its very own character Evan the Eagle! See if you can spot him! Order your poster today at [www.getkidsintosurvey.com](http://www.getkidsintosurvey.com).

NOTE: When ordering, you may see that the price shows as Pound Sterling (£); however, when you choose to purchase in the US it will calculate in Dollars.

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See Page 22 for  
 Mining Surveying Poster



# History of Time in the United States

The history of standard time in the United States began November 18, 1883, when United States and Canadian railroads instituted standard time in time zones. Before then, time of day was a local matter, and most cities and towns used some form of local solar time, maintained by some well-known clock (for example, on a church steeple or in a jeweler's window). The new standard time system was not immediately embraced by all.

Use of standard time gradually increased because of its obvious practical advantages for communication and travel. Standard time in time zones was not established in U.S. law until the Standard Time Act of 1918 of March 19, 1918, also known as the Calder Act (15 USC 260). The act established daylight saving time, itself a contentious idea.

Daylight saving time was repealed in 1919, but standard time in time zones remained in law, with the Interstate Commerce Commission (ICC) having the authority over time zone boundaries. Daylight time became a local matter. It was re-established nationally early in World War II, and was continuously observed until the end of the war.

After the war, its use varied among states and localities. The Uniform Time Act of 1966 provided standardization in the dates of beginning and end of daylight time in the U.S. but allowed for local exemptions from its observance. The act also continued the authority of the ICC over time zone boundaries. In subsequent years, the United States Congress transferred the authority over time zones to the U.S. Department of Transportation (DOT), modified (several times) the beginning date of daylight time, and renames the three western most time zones.

Time zone boundaries have changed greatly since their original introduction and changes still occasionally occur. DOT issues press releases when these changes are made. Generally, time zone boundaries have tended to shift westward. Places on the eastern edge of a time zone can effectively move sunset an hour later (by the clock) by shifting to the time zone immediately to their east.

If they do so, the boundary of that zone is locally shifted to the west, the accumulation of such changes results in the long-term westward trend. The process is not inexorable, however, since the late sunrises experienced by such places during the winter may be regarded as too undesirable. Furthermore, under the law, the principal standard for deciding on a time zone change is the "convenience of commerce." Proposed time zone changes have been both approved and rejected based

on this criterion, although most such proposals have been accepted.

Interesting Time Zone Trivia:

1. Although Russia is geographically spread over 12 time zones, it officially observes only 9 time zones (from March 2010).
2. Australia has both horizontal and vertical time zones in summer.
3. If two places are located in opposite hemispheres and both places use DST - the time difference between those two places can be 1 – 3 hours offset during a year.
4. Equatorial and tropical countries (lower latitudes) usually do not observe Daylight Saving Time as the duration of day / night are very much the same – 12 hours.
5. Usually, when one travels in an easterly direction – a different time zone is crossed every 15 degrees of longitude (which is equal to one hour in time). However, there are exceptions.
6. China observes one time zone UTC/GMT + 08:00 – which makes this time zone uncommonly wide. In the extreme western part of China the sun is at its highest point at 15:00, in the extreme eastern part – at 11:00.
7. "Daylight Saving Time" (DST) is the name commonly used in North America. Some regions (Europe, South America) more commonly use the name "Summer Time". This could create some confusion in meaning of some time zone abbreviations, as ST could stand for "Summer Time" + 1 hour (Europe, South America) and for "Standard Time: (North America).
8. The state of Arizona does not observe DST. However the Navajo Reservation does change to Daylight time. The Hopi Reservation is within the Navajo Reservation and does not observe DST (as does the rest of the state).
9. Some countries use different rules to start and end DST. For example, a law in Israel requires that summer must last at least 150 days.
10. Greenwich time (Greenwich lab is located in London) as the same time as London time during winter time, however London is 1 hour ahead of GMT during summer time.

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As seen in *The UCLS Newsletter*, March 2017



# Drones (Photogrammetry) vs Terrestrial LiDAR –

## What Kind of Accuracy Do You Need?

By: **Jonathan Barnes**  
April 18, 2018 – Commercial UAV News

How accurate does the information you're gathering need to be? What does survey-grade accuracy really mean? Will gathering information that fits this description make a difference for your project?

These are just a few of the questions that professionals working in industries that range from construction to mining to oil & gas deal with when it comes to evaluating the merits of capturing 3D data using a drone equipped with only a camera (photogrammetry) versus using a terrestrial laser scanner. It's absolutely possible to mount a laser scanner on a drone, but for the purposes of this discussion, we're focused on what it means to compare photogrammetric data captured in the air via drone with LiDAR data captured via a ground-based laser scanner.

While survey professionals have historically relied on terrestrial lidar to gather actionable info, drone photogrammetry solutions are increasingly capable of gathering data that professionals require. Does that mean we'll soon see the death of laser scanning?

Traditionally, the main challenge with laser scanning adoption was cost. Those costs are a major discussion point in the photogrammetry vs LiDAR argument, mostly because in this type of comparison, LiDAR is still more expensive, even though the technology is now more affordable than ever. As people on both sides of that debate will tell you though, costs really shouldn't be driving the decision, because the limitations and strengths of each technology should be the essential focus. Those inherent strengths are just part of the reason we're nowhere near seeing the death of the laser scanner, and why most professionals talk about the importance of defining the accuracy you need on a given project before discussing one solution over another.

Since the Question remains whether survey-grade information is absolutely necessary, most professionals concede there's no silver bullet solution. Just like comparisons of drones with manned aircraft and satellite solutions, what makes sense is going to depend on what it will mean to serve the clients' needs as well as possible, and the best answer can even be a combination of these technologies. That said – there are some good rules of thumb to keep in mind when it comes to decisions about staying on the ground or taking to the sky.

### ***Choose Drone / Photogrammetry When ...***

When the area to be surveyed is large and outdoor, it's often best to use a drone for the job.

Drone technology can cover a large area with a single unit and a few batteries. That area can be exponentially expanded with a few units, but there are limitations in terms of scale. Such an application is good for an area that is hundreds of acres in size, but it's not going to be the best approach for an area that's hundreds of miles in size.

### ***Choose Terrestrial LiDAR When ...***

When a high degree of accuracy is important, terrestrial LiDAR is oftentimes the best choice.

As an example of this, consider the archeological survey of an area containing Mayan ruins, explains Dan Hubert, owner of Modus Robotics. "They might take an approach of using LiDAR [attached to a plane] flying over the top of the ruins, to get through the vegetation, to see where that civilization's remains are."

How does terrestrial LiDAR tie-in? They can be the right choice when you need a detailed look at this kind of site. After a LiDAR-equipped plane makes its flyover, professionals might want to get minute detail on a part of the topography surveyed. For that kind of detail, it can make sense to employ a terrestrial scanner, which will provide detail down to the 1 millimeter-level.

"Now you have a historical document that you can load into an archeological or GIS database," Hubert says.

### ***Choose Drone / Photogrammetry When ...***

There are times when it makes more sense to add a drone to the process you already employ. That said, a firm must know whether it's logical to use a drone or not for a given situation, otherwise trying to integrate one can create unnecessary confusion.

"Is drone data collection going to help?" Hubert asks prospective clients. "And how might data automation get you a competitive advantage?"

Much of this goes back to the question of how accurate the data being gathered needs to be, and it's one that needs to be asked and answered at the beginning of any project.

### ***Choose Drone / Photogrammetry When ...***

Drones meet or exceed expectations of delivery of data.

"People are using Part 107 to find savings that reduce walk time, and which allows skilled labor to go to an executable skilled labor job, rather than to an inspection job," Hubert says.

### ***Choose Terrestrial LiDAR When ...***



The job calls for contour mapping. Some jobs require it, and a drone isn't necessarily equipped to provide such detail.

### **Choose Drone / Photogrammetry When ...**

Obstructions are in the way. If a job required mapping around a power line or another obstruction, sometimes drones are just the right tool for the job. Ground based laser scanners often can't handle such tasks as efficiently as drones.

### **Choose Terrestrial LiDAR When ...**

It is required by job specifications. However, consider how information gathered via drone could create a new value proposition.

Mapping below a tree canopy or another obstruction requires LiDAR, and clients will often mandate this approach. However, similar mandates might exist for a transmission line job, and there's an opportunity to utilize a drone in this circumstance. It's all about the right tool for the right job, and more and more that means utilizing drones and terrestrial laser scanners together.

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*As Seen in Missouri Surveyor, June 2018*

## **Comments On "History of Time in the United States"**

*By: Warren L. Fisk*

As noted in the first paragraph of the article, standardized time zones were not realized until late in 1883. Prior to that, time and subsequent to the extended development of the Burt's solar compass in the late 1850's, time at a given location was apt to be somewhat chaotic. Railroad schedules between different rail companies in the same area were up to an hour in disagreement. Since the Burt's Solar Compass relies on apparent time as a factor, locally recognized times were not always satisfactory. Apparent time is very localized and can best be described by a sun dial. However, the sun dial at a given location must be oriented to true north at noon. For Burt's purposes, true north as determined by a magnetic compass set to consider proper declinations would have been adequate.

It is my understanding that a 5 minute error in apparent time only resulted in a few arc minutes of azimuth error when using the Burt's Solar compass. This is much better than achieved with a magnetic compass.

In Dakota Territory in the 1860's and 1870's we have seen an increasing use of the Burt's equipment over time with better results in the field. With the standardization of time zones it became easier to make any hour observations of the sun and stars, but the most popular remained as Polaris observations at elongation (which relied more on star movement rather than a time piece).

The following information is taken from meeting minutes of the  
**South Dakota Board of Technical Professions**  
complete meeting minutes can be found at:  
<http://dlr.sd.gov/btp>

**May 18, 2018**

### **Approvals:**

Approve the following examinee passing the Principles of Surveying (PS) Exam:

Tyler Alan Smith – LS 13779

Approve the following examinees to take the Fundamentals of Surveying (FS) Exam:

Nicholas Alan Bixeman  
James A. Pond  
Trenton Walters

Deny the following examinee to take the Fundamentals of Surveying (FX) Exam based upon lack of educational hours:

Eric Kloehn

Approve the following examinee to take the Principles and Practices of Surveying (PS) Exam:

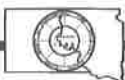
Clay Morgan Tarrant

Approve the following Land Surveyors (LS) by Comity application:

Nathaniel William Austin – LS 13791  
Todd W. Norton – LS 13792

*"Knowledge is knowing  
that a tomato is a fruit;  
wisdom is not putting  
it in a fruit salad.*

*- Farmer's Almanac -*





# The Land Surveyor's Guide to the Supreme Court of South Dakota Part 23 – 1942 to 1943

*This article represents the twenty-third in a series of excerpts from a book prepared by South Dakota licensee Brian Portwood. The complete book can be obtained in PDF form by double clicking on the link in the lower left portion of the SDSPLS Homepage. It covers 120 years of historic South Dakota cases, answering fundamental land rights questions of potential interest to land surveyors, which are being presented in chronological order here in Backsights & Foresights.*

## What distinguishes a license from an easement? First Church of Christ, Scientist v Revell (1942)

As may have been noticed by those who have read all of the material presented up to this point sequentially, boundary cases were more common than easement cases during the first half century of statehood, but here we reach a point of transition, from which easement cases will gradually come to dominate over boundary cases, most major boundary issues having already been dealt with by the Court by this time, while easement issues were destined to arise with increasing frequency during the era of modern land use. The conflict that grew into the case we are about to review is highly emblematic of this transition, from a society in which informal and undocumented land use was fairly common, and was routinely treated as acceptable, into a modern society, far more intensively focused upon the value of every land use, and in this instance that transition resulted in one of the most frequently cited easement cases in South Dakota history. Although some degree of irony may be noted, in identifying this controversy as an easement case, since no easements whatsoever are ultimately found to exist on any of the properties that are involved, this scenario nonetheless provides a classic illustration of what the Court sees as the fundamental limitations upon the creation of easements by unwritten means. Here we watch as the Court again draws and applies the distinction between an easement and a license, which as noted in our review of the 1922 Herrick case, defines the crucial divide between permanent land rights and mere personal privileges that do not truly constitute genuine land rights at all. As has also been observed in discussing some of our previous cases, here again we can clearly see that the passage of time alone does not conclusively create any land rights, because all undocumented uses of land, even those that have endured for generations, remain potentially subject to explanation as personal privileges, if through effective

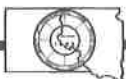
investigation of historic conditions and developments, convincing evidence to that effect, which is deemed to be sufficient by the Court, can be presented. The elevated standard of proof that is required by the Court on this occasion to support a finding of dedication by means of implication is also noteworthy, since the language used to define that standard at this time would go on to be reiterated by the Court in numerous future cases, whenever the evidence of an alleged dedication proves to be unsatisfactory to the Court, although the Court would remain generally inclined to view unwritten dedication claims favorably. Likewise, we look on as the Court here adopts a relatively stern, yet entirely reasonable, set of basic requirements with which to regulate the application of estoppel, in the context of easement claims, which the Court would also quite frequently reference in future cases, when circumstances appear that lead the Court to find the use of estoppel to be unjustified. In each of these several important respects, this case serves as a warning to those who may unwisely set out to assert easement claims which are inadequately supported by the evidence that they are prepared to place before the Court.

**Prior to 1880** - A group of lots were platted, in a block fronting upon the south side of Main Street in Lead. The dimensions of these lots are unknown, but they were presumably typical rectangular lots, and this block contained no platted alley, so there was no intention for these lots to be accessed from the rear.

**1880** - Esterbrook acquired a lot situated near the middle of this block, and Caretto acquired the lot lying directly west of it.

**1881 to 1911** - Esterbrook was a grocer who operated a store located in another part of the town, and he kept a team of delivery horses in a barn that was located in the southwest corner of his lot, so a passageway, about 10 feet wide, developed along the west side of his lot, as he regularly took his team on trips beginning and ending at the barn. Both Esterbrook and Caretto had houses situated near the front of their lots, but Caretto's house occupied nearly the full width of his lot, so he asked Esterbrook if he could use Esterbrook's driveway, for deliveries of firewood or coal, which required access to the rear of Caretto's house, and Esterbrook agreed to allow Caretto to make such use of the passageway, which Esterbrook described as an "alley". Both men were fully aware that the alley was located entirely on Esterbrook's lot, there was a fence along the lot line between them, and both parties understood that the fence was located on their common lot line, so their was never any dispute over the location of their mutual boundary, and on that basis, Caretto made regular use of the alley, by virtue of Esterbrook's permission, throughout this period. The lot lying directly to the east of Esterbrook's lot, and the lot lying

(Continued on Page 24)



directly to the west of Caretto's lot, also had no driveways, being apparently occupied by large houses like that of Caretto, so the alley also came to be used as a means of access to the rear of these other lots, without objection from anyone. Delivery personnel routinely parked their wagons in the alley and travelled by foot across the rear of the Esterbrook and Caretto lots, to reach the rear of the houses situated on the adjoining lots. There is no indication that Esterbrook ever gave express permission to the owners of these other lots to utilize his property in this manner, but all 4 parties evidently remained completely comfortable and satisfied with this arrangement as the decades passed.

**1912** - Esterbrook sold his lot to Feeney, and Feeney evidently allowed the use of the alley by others to continue.

**1913** - Feeney sold his lot to Meade, and Meade evidently allowed the use of the alley by others to continue as well.

**1917** - Meade sold his lot to the Church, and a new church building was erected where Esterbrook's house had stood. The alley continued to be used just as it always had, undisturbed and in the same location, for purposes of deliveries to all 4 of these lots, as well as general access to the church building for all other purposes, but whether or not Esterbrook's barn still existed at this time is unknown.

**1918 to 1933** - During this period, the owner of the lot lying directly east of the former Esterbrook lot built a garage on the rear portion of his lot, and this garage faced west, toward the rear portion of the lot owned by the Church. This lot owner then sought and obtained permission from some unknown party, apparently representing the Church, to drive around the west side of the church building and across the rear portion of the Church lot, and he proceeded to access his garage in this way on a regular basis. In addition, during this period the rear portion of the lot owned by the Church came to be used as a driveway and parking area by church members and possibly by others.

**1934** - Caretto put his lot up for sale and Revell expressed an interest in buying it, but Revell had concerns about access to the rear part of the Caretto lot, so Revell ordered a survey, which apparently confirmed the location of the lot boundaries, but did not indicate that any access easement existed in the location of the church driveway or anywhere else south of Main Street. Whether or not Caretto told Revell anything about the driveway is unknown, but Revell proceeded to make a personal investigation of the access situation, and he learned the full history of

the driveway, as described above. Revell then attended a meeting of a group of church members, at which he informed them that he believed Caretto had acquired an easement allowing him to use their driveway. No one present at the meeting had any experience dealing with land rights, so no one understood what Revell meant, and therefore no one responded to Revell's suggestion that an access easement existed upon the property owned by the Church. Upon getting no response, Revell then offered to purchase the driveway, but again no one present felt compelled or authorized to respond, so Revell departed and the matter was thus left unresolved. Nevertheless, Revell proceeded to acquire the Caretto lot, and he had the house rebuilt in the same location, and he also had a garage built behind the house, opening to the east. since he planned to access it by means of the church driveway. No one ever objected to the ongoing use of the driveway by Revell or any of his construction personnel during the construction process. During the course of the work however, some trees that had apparently stood either on or near the east line of the Caretto lot were removed, and this made some of the church members very unhappy with Revell, since they evidently believed that they had some right or interest in those trees, so they resented the fact that Revell had removed the trees without consulting them.

**1935 to 1941** - At an unspecified time during this period, the church members evidently became increasingly unhappy with Revell, and they eventually decided to legally challenge his ongoing use of their driveway, so they filed an action against him, seeking to have him compelled to cease his use of it.

The Church argued that clear evidence existed that all use of the driveway in question, since its inception over 60 years before in 1880, had been expressly permitted by the successive parties who had owned the lot bearing the driveway, and who were thereby legally authorized to grant such permission, so all such use had been made under an oral license, and none of it had been adverse in nature, nor did the use represent a dedication, therefore no access easement had ever been created by any such use, and the Church remained free to revoke that license at any time. Revell argued that the evidence of verbal permission to use the driveway was unclear and insufficient, and the use had in fact been adverse to all of the successive owners of the Esterbrook lot, so a prescriptive easement covering the driveway had been created, and it still existed to his benefit. He also argued alternatively that since Esterbrook had made reference to the driveway as being an alley, and had always treated it as such, and Esterbrook had never objected to the use of it by anyone, Esterbrook had intended to dedicate it, so it was actually not just a private easement but a public alley. Revell further argued that since the church members had seen him openly constructing his garage, adjoining and facing their





driveway, they should be estopped from thereafter taking the position that he had no right to use the driveway, since their unjustified silence during the construction of the garage had resulted in the erection of a building that would otherwise now be useless to Revell. The trial court agreed with the Church, that the evidence provided no basis upon which to found the creation of an easement, so no easement of any kind relating to the driveway in question existed, and the Church was at liberty to bar any further use whatsoever of the church lot by Revell.

Before examining the details of this conflict, it should be noted that very ironically, just as in our last previous case, the destruction of trees was once again here the catalyst that served to ignite what would prove to be a much larger conflict between adjoining land owners, although the situation here was of an entirely different nature than that presented by the Waldner case, showing just how precious and significant trees and other such items can be to many people. Conversely, in stark contrast to the glaring evidentiary failures that were referenced in discussing the Waldner case, this case amply demonstrates the great value of diligence in gathering comprehensive historical evidence that may prove to be relevant to any land rights dispute, which enabled the church members to show the manner in which the driveway in controversy had been used, and most importantly, to illustrate the true origin of that use for consideration by the Court. The most critical issue of course, as is always true in the resolution of such matters, was the intent of the original parties, and the evidence clearly revealed that the use of the driveway in question had always been permissive in nature, strongly suggesting that no permanent rights were ever intended to be created or granted by Esterbrook or any of his successor owners. The evidence showing that Caretto had never made any improvements or any other investments in reliance upon the ongoing use of the Esterbrook driveway was especially key to the outcome, indicating as it did, that Caretto realized that his agreement with his neighbor regarding the use of the driveway was a mere personal privilege bestowed upon him, in the nature of a revocable license, and not a permanent right in the nature of an easement, which would have given him the right to insist that the driveway be kept fully open and available at all times. Revell was a doctor, who was obviously very intelligent and quite clever, and he attempted to use every possible legal and equitable mechanism that was potentially available to him in his defense, but the Court was entirely unimpressed with his positions, and it was fully prepared to put each of his arguments to rest. Although his case was doomed by the veritable mountain of strong testimonial evidence of permissive use of the driveway that was presented on behalf of the Church, Revell adroitly made several arguments that gave the Court the opportunity to expound on 3 highly important aspects of easement law, those being licenses, implied dedication, and estoppel in the context of land use. In a particularly well organized and well structured opinion, the Court methodically and systematically marched through the successive defenses

that had been offered up by Revell's legal team, dismembering each of them individually, on separate grounds, specifically addressing all of the relevant issues that had been set forth by Revell, and putting the historic use of the driveway, despite it's overwhelmingly long duration, in context in so doing:

*"The court found the use of the driveway prior to 1934 to be permissive ... this finding must stand ... no different inference could be legitimately drawn from this evidence ... The use was not adverse ... therefore the Carettos did not acquire an easement in the Esterbrook-Church lot ... If this record would sustain a finding that the Carettos made expenditures or improvements on the faith of a continuance of the parol license granted by Mr. Esterbrook ... the field of inquiry thus opened would be made interesting ... however ... the record will not sustain a finding that the Carettos made expenditure or improvement on the faith of a continuance of the license ... The license to the Carettos was revocable, personal and unassignable ... a mere showing of public use of a roadway of the character under consideration will not support an inference of dedication ... the record fails to establish an implied dedication at any time ... such general use was for the ultimate benefit of immediate neighbors who were not only close friends, but also business customers ... acts of common neighborliness ... not sufficient to establish a dedication ... Revells knew ... that fee title in the driveway was in the Church ... The Church ... sought no advantage of the Revells. It did not believe the claim of easement to be valid, but hoped a disposition of the controversy would be effected ... Revells admit that they were not influenced in their course by that which the Church did, or failed to do ... estoppel ... is not available to a litigant as a shield from damage resulting from his unilateral uninfluenced errors of judgment ... estoppel ... has no function to perform in such circumstances ... Revell ... must bear the loss occasioned by his error in judgment."*

As we have already repeatedly observed in reviewing earlier cases, every grantee bears a fundamental burden to take notice of all existing physical conditions relating to any land acquisition being made by him, and Revell was evidently quite aware of that, so he knew that he was on inquiry notice, concerning the lack of access to the rear portion of the lot that he intended to acquire. Revell very admirably fulfilled his burden to investigate the visible access problem, but upon discovering that no driveway easement existed, he then very unwisely chose to simply ignore what he had learned, and it was this poor decision that cost him his precious status as an innocent purchaser, in the eyes of the Court. A great lesson is also taught here in regard to the applicability of the elements of equity to such situations, and that is the fact that

*(Continued on Page 26)*



whenever a highly intelligent, erudite, or sophisticated party, deals with others who are ignorant, uninformed, inexperienced, or otherwise below his own professional level, in terms of knowledge, the professional party bears an elevated burden, to act in a manner that does not turn the ignorance of the others to his own advantage, so he cannot simply assume that the plain silence of ignorant parties represents agreement on their part. A license, such as that held by Caretto relating to the driveway in question, the Court acknowledged, definitely can become legally irrevocable and binding, but only when money is expended by the licensee, in justifiable reliance upon the ongoing existence of the license, while the mere passage of time, without any such meaningful investment by the licensee, leaves the license perpetually subject to revocation. A license is necessarily unassignable, the Court noted, since a license is, by definition, a personal privilege, that remains always susceptible to revocation, at the discretion of the licensor, and it cannot become irrevocable, effectively creating an easement that runs with the land, unless it is relied upon in making improvements, which Caretto had never done, so no private easement, based on either prescription or a license that had become binding upon the Church, existed for Caretto to transfer to Revell. The dedication claim made by Revell was readily dismissed by the Court, on the grounds that ambivalent or ambiguous acts do not meet the legal requirements for an implied dedication, which must be supported by unequivocal and unmistakable evidence of intent to dedicate, in the view taken here by the Court, stating that use of a driveway by tradesmen or deliverymen cannot be deemed public use, because such parties when on a business errand, are essentially acting as mere servants or employees, so no dedication of any alley by implication had ever taken place. Lastly, in fully upholding the lower court decision against Revell, the Court ruled that his assertion of estoppel was futile, because estoppel requires the presence of 3 vital elements, those being a lack of knowledge on the part of the alleged victim, such as Revell in this instance, actual reliance upon misleading conduct by the opposing party, and results that are truly detrimental to the alleged victim. Revell had certainly experienced detrimental results, but they had stemmed from his own mistaken notions, not from any misleading actions, statements or suggestions of others, and his key mistake had been his false assumption that the apparent acquiescence of the church members, as manifested by their plain silence and unresponsiveness to his words and actions, was equivalent to agreement on their part, with his own notions regarding the legal status of their driveway. Revell's unfortunate miscalculation poignantly demonstrates the very important point that long use alone is not necessarily indicative of the existence of permanent land rights, although it very often can be, and the Court had utilized his folly to provide a stern reminder that well defined legal limitations do exist, governing the creation of easements.

**How is the location of an ambiguous easement determined?  
Graff v Budgett (1943)**

One of the most common and most troublesome issues that land surveyors are compelled to deal with is the presence of ambiguity in legal descriptions, even if the surveyor is an excellent description writer, the need to deal properly with problematic descriptions that have been created by others is inescapable, and our next case focuses squarely on that issue, revealing the common sense approach that the Court, in its wisdom, takes to resolving such matters. While surveyors obviously do not have the authority to make decisions that are conclusive in nature, or that have any such legally binding effect as decisions made by the Court, surveyors can nonetheless benefit from observing that the Court rarely bases its decisions upon technicalities, the Court distinctly prefers to produce results that are founded upon principles of justice, and as exhibited here, that applies to conflicts over the validity and meaning of descriptions of land rights. While poor descriptions can and often do cause boundary controversies, they can just as easily create problems for holders and users of easements, or for the owners of land burdened with an easement, and as noted in discussing this case, the same basic principles of both law and equity that apply to boundary resolution can be applied equally well to the resolution of easement issues. The case we are about to review is one of many that came to the Court twice, in this instance because on the first occasion the Court recognized that the dispute had not been fully resolved, since the location aspect of the controversy had been neglected, even though the lack of clarity in the location of the easement at issue was the true source of the litigation, and in fact the presence of that ambiguity represented the only basis upon which the validity of the easement could be challenged. As will be seen, once the trial court deals with the description issue and eliminates the description ambiguity, exercising the principle of monument control, by treating the roadway in question as a physical object equivalent in controlling force to a monument, the Court fully supports the outcome, satisfied that both the title and boundary aspects of the matter have been properly adjudicated, upon the second visitation of the case. This thorough treatment of the situation presented here clearly illustrates that the Court can and does distinguish location issues from title issues when necessary, showing that the Court fully understands and appreciates that vital distinction, and will require it to be properly addressed whenever doing so serves the ends of justice. Here we also learn that when a material difference between a loosely described easement location and the location actually used on the ground exists, the Court is inclined to welcome and embrace a solution that adapts the inadequate description to the physically established location, by approving the concept that such rights are best defined by the location that has been put into actual use. In addition, the result produced here foreshadows



future decisions of the Court on the topic of easement relocation, by demonstrating the Court's tendency toward flexibility when dealing with location issues, as well as the Court's acceptance of acquiescence as a factor in defining locations of land rights.

**1913** - W. Budgett owned a certain platted lot in Sioux Falls, which was bounded on the west by Phillips Avenue and on the north by a railroad right-of-way, with adjoining lots lying to the east and to the south of it. This lot had 85 feet of frontage on Phillips Avenue, but it was only 69 feet in width in the rear, because the railroad ran on a bearing that was somewhat south of due east, and this lot was 158 feet in depth. There is no indication of how or when W. Budgett had acquired this lot, but his title to it was never questioned, and at this time he conveyed the south 41 feet of his lot to G. Budgett, who was apparently either a brother or a son of W. Budgett, while W. Budgett continued to own and reside upon the north 44 feet of the lot. There were existing houses situated on the front part of both the northerly portion and the southerly portion of the Budgett lot at this time, which prevented direct vehicular access to the rear of the lot from Phillips Avenue. A trail or pathway of some kind that was evidently suitable for vehicular use did exist however, running inside the railroad right-of-way, along the south side of the track, and the railroad right-of-way was evidently unfenced, so it was possible to drive into the rear part of the Budgett property from Phillips Avenue by following this route and then turning south after passing the north house. W. Budgett also had a garage that was located in the northeast corner of the Budgett lot, and this garage had been constructed facing north, so W. Budgett could access it by driving inside the railroad right-of-way, and then turning south into the garage, which he had been doing for an unspecified length of time. Whether W. Budgett was using the railroad right-of-way for his own access purposes surreptitiously, or through permission from the railroad, is unknown. Whether or not G. Budgett ever used this same access route as a way of driving into the rear part of the southerly portion of the lot that he acquired at this time is also unknown.

**1919** - G. Budgett conveyed the same portion of the Budgett lot that he had acquired 6 years before to Park, and Park evidently intended to build a garage in the rear of this property, behind the house, so he wanted to insure that he would have the right to drive into the rear portion of his property by crossing the northerly portion of the Budgett lot, which was still owned by W. Budgett. Therefore, on the same day, W. Budgett conveyed an access easement to Park, apparently intending to grant Park the right to drive across the northerly portion of the Budgett lot in order to reach the rear part of the southerly portion of the Budgett lot, which Park had just acquired from G. Budgett. The easement description created at this

time would prove to be highly problematic however, because depending upon how it was interpreted, it defined a route that potentially ran right through both the house and the garage that were located on the property that was still owned by W. Budgett. Who wrote this access easement description is unknown, presumably it was either written by W. Budgett himself or by someone acting on his behalf.

**1923 to 1940** - After apparently making no use of his access easement for 4 years, Park began utilizing the roadway that was situated inside the railroad right-of-way, and he also regularly drove across the middle of the northerly portion of the Budgett lot, to reach the rear part of the Park property. At an unspecified date during this period W. Budgett evidently either died or moved away, leaving G. Budgett as either the owner or the tenant of the northerly portion of the Budgett lot. No one ever objected to the location of the path across the Budgett property that Park had chosen to drive upon, although it was not in the location that had been described in his access easement deed, so he continued driving through the middle of the backyard, between the Budgett house and the Budgett garage, throughout this period. At an unspecified date, evidently near the end of this period, Park conveyed his property to Graff, along with his access rights, and Graff commenced to drive the same path running through the backyard of the Budgett property, just as Park had always done, but G. Budgett objected, and directed Graff to stop driving through his backyard. Graff then filed an action against Budgett, and Graff prevailed, as the trial court upheld the validity of the access easement, but the trial court did not specifically address the fact that the location being used by Graff was not the same location that was described in the 1919 easement deed to Park, so the dispute between Graff and Budgett remained unsettled, and Budgett chose to appeal the matter to the Court.

**1941** - The case came to the Court for the first time, and the Court reversed the ruling of the trial court, on the basis that the lower court had improperly confirmed the existence of the easement in question, without addressing or defining the location of the access rights held by Graff, so the matter was returned to the lower court and a new trial was held, with the objective of fully adjudicating the location issue, in addition to revisiting the determination relating to the existence of the easement.

Graff argued that the access easement that had been granted to Park in 1919 was perfectly valid, and that he was entitled to utilize it just as Park had, since he was the grantee of Park. He further argued that although the location of the easement, as it was described in the 1919 deed, was either unclear or incorrect, this could have no impact on the validity of the easement, because the truly

*(Continued on Page 28)*

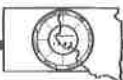


intended location had been clearly established on the ground, through the use of the easement that had actually been made by Park for many years, without any protest or interruption by anyone. Graff therefore maintained that he had the right to drive the same route across the Budgett property that Park had always driven, regardless of where the described location of the easement was, because the actual route had been physically defined, and it was clearly visible and in active use, at the time he acquired his property and his access rights, so he had the right to rely on the existing visible easement location. Budgett argued that the easement in question should be declared to be invalid, because the description by which it had been created was too unclear and ambiguous to define any specific location, and an easement cannot exist without a clearly defined location, nor can an inadequate easement description be changed based on any evidence that arises subsequent to the deed in which it was described. He further argued that the description of the easement indicated that there was never any intention to place the easement anywhere on the Budgett lot, so if the easement did exist at all, it was not located anywhere on the Budgett property. Therefore, Budgett asserted, Graff had no right to drive anywhere on the Budgett property, including the location that Park had used, because Graff could not prove that the location Park had used was the originally intended easement location, since that location had never been described as being part of the easement in question. The trial court once again held that the access easement had been legitimately created and conveyed, so it was valid, and Graff had the right to use it, just as the trial judge had ruled at the conclusion of the first trial, but this time the trial judge took the additional step of defining the location that had been used by Park with metes and bounds, effectively reforming the ambiguous 1919 easement description, on the basis that the location used by Park did in fact represent the best evidence of the true originally intended easement location.

The first important issue presented by this scenario, the Court recognized, was the fact that the determination of the validity or existence of the easement in dispute represented one distinct legal question, while the location of the easement on the ground represented a separate legal question, with the former question necessarily being the primary one, and the latter question being secondary in nature. This relationship between the existence and the location of an easement is precisely analogous to the distinction between title issues and boundary issues, because in both instances two determinations must be made, to fully resolve the separate matters of ownership and location. In many situations however, as we have observed in discussing several of the boundary cases that we have reviewed, location issues have a direct bearing upon title issues, and that was true here, since the location of the easement in question would determine whether or not, and to what extent, that easement

burdened the title to the Budgett property. Under a highly strained interpretation of the easement description, Budgett asserted that it was not located on his property at all, stating that it had really been intended to follow the road that was located inside the railroad right-of-way, and to run around the north and east sides of the garage that sat at the extreme northeast corner of the Budgett property, which would obviously place the easement completely on property owned by others. Budgett maintained that this was the only logical interpretation of the easement description, because if the easement were any further south or west, it would run through the Budgett house and the Budgett garage, which was clearly not possible and could not have been intended. The Court quite rightly deemed this position to be completely untenable however, because the easement deed both openly and implicitly indicated that the right of passage being created and conveyed was located on the property of W. Budgett, the grantor, and also because it is not possible for anyone to successfully create or grant an easement over any property that is not owned by the grantor. Therefore, the Court found that the easement had been legitimately created, and legitimately transferred to Graff, so it did exist as a burden upon the Budgett lot, regardless of how well or how poorly it's location had been described, because it was clear that W. Budgett had intended to convey an easement to Park, and the only place that such an easement could possibly be created by W. Budgett was on the portion of the Budgett lot that was owned by him at that time. For the same reason, the Court dismissed the suggestion raised by Budgett that the ambiguity of the easement description nullified the easement, because the validity of an easement is controlled solely by the fact that the grantor intended to create and grant a specific right, such as a right of passage in this case, and additional evidence can always be introduced to clarify the separate issue of where the easement is located, so no lack of clarity in describing an easement location can operate to completely destroy the easement. Having thereby narrowed the conflict down to the true core issue, which was where the easement was really intended to be, the Court stated it's perspective on the situation, first quoting in part from the description in controversy, before proceeding on to assess the description's intent and to announce the result of such ambiguous description language:

*"Whereas the grantors are seized of an estate in fee simple ... Whereas the grantee is seized in fee simple of the south 41 feet ... said grantors have agreed ... to grant an easement or right-of-way over a private road and across the east end of said premises of the grantors to provide ingress and egress to said grantee to the east end of his said premises ... the grantors hereby grant unto said Park, his heirs and assigns, full and free right ... to pass and repass along said private road that is next to the right-of-way ... of the width of 12 feet as ingress and egress from Phillips Avenue to the back end of*



*the grantee's property and across the back end of grantor's land ... (The Court resuming) the parties intended to create a right-of-way at some point on the back end of the grantor's property ... the right-of-way granted across the back end of grantor's land by the deed is indefinite in location, and has been treated so by the parties since the making of the deed ... the term "back end of grantor's land" was used in the deed, we believe, only in a general way, and not with the intention of referring to the rear twelve feet of the grantor's lot ... the location of the right-of-way in the deed was indefinite ... the parties did not consider the way definitely located by the deed ... the deed being indefinite, it was within the authority of the trial court to locate the way ... In view of the ... acquiescence in the use of the driveway since 1923 ... the location ... should not be disturbed."*

Since the trial judge had taken the extra step of expressly describing the location that had been used by Park with metes and bounds, locking down its location, the Court was comfortable with the outcome, and therefore upheld the ruling of the lower court in favor of Graff in all respects, upon this second review of the matter, although one Justice did dissent this result. Despite the fact that the final location of the easement was about 50 feet west of the rear lot line, slicing right through the middle of Budgett's backyard, the Court did not characterize the easement as having been relocated, the Court instead took the position that since this location was within the rear half of the Budgett lot, it satisfied the call in the description for the easement to be located at the "back end" of the lot. This decision by the Court clearly reflects the Court's strong focus on protecting the interests of innocent grantees, such as Park and Graff, while holding grantors fully accountable for their description failures, particularly when negligent behavior on the part of the grantor is apparent, and that was certainly the case here, since W. Budgett had planted the seeds of this conflict, by granting Park an easement in a location that was impossible to use, due to the presence of the Budgett house and garage. In the view of the situation taken by the Court, the fact that Park had adopted another location, and the Budgetts had both tacitly approved that location with their acquiescence, indicated that the route that was actually driven represented the truly intended easement location, to the satisfaction of all parties, making it binding by virtue of the deed, so the new location did not represent a deliberate or intentional relocation of the easement, it merely solidified the unclearly described original location. The principle thus applied by the Court, as can readily be seen, was none other than the principle of monument control, typically applied to boundary disputes, since just as in the boundary cases, the Court here treated the physical evidence as primary, allowing it to control the described location, just as an original survey monument controls over the numerical calls in a boundary description, showing that the Court saw the path driven

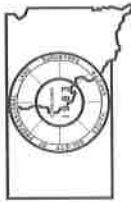
by Park as a monument, allowing the description to be corrected to conform to the location that Park had physically established on the ground. The fundamental mistake made by Budgett was that he failed to realize that the rights of Graff were just as strong as the rights of Park, and in fact Graff's rights, as the innocent grantee of Park, were legally identical to the rights that Park had established, because Park had acquired a permanent right of passage over the Budgett property, which could not be unilaterally retracted or eradicated by Budgett on the mere basis that it had been poorly described. Budgett failed to realize that by allowing Park to use any route other than the one that had been described, he had effectively consented that the route used by Park was the genuine original location, and the Court naturally declined to allow Budgett to deny that, since doing so would result in damage to the rights of a legitimate successor of Budgett's own grantee. At the core of Budgett's argument was the notion that no easement can ever be relocated through the use of a variant location, so every easement must be declared to be either valid or invalid based on its described location, but this was a notion that the Court was quite rightly not prepared to accept, and as we will see in future cases, the Court would later go on to formally adopt the easement relocation doctrine, which stands directly contrary to the position that was unsuccessfully set forth by Budgett on this occasion. In conclusion, this case provides a classic example of the kind of massively expensive and purely unnecessary litigation that can result from a poorly written easement description, and it also illustrates the fact that the Court wisely declines to allow either grantors or their successors the opportunity to benefit from their own carelessness in the use of description language.

### Caption This



*"Guess I missed that chapter in the staking manual."*





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