

# OZARK CHAPTER MSPS NEWSLETTER

March 3, 2009

## The next meeting is March 10, 2009 at 6 p.m. at Western Sizzlin on East Kearney.

Index to Mike Gray's: Mike Gray<sup>1</sup> is the elder and statesman-like Mike Gray, Mike Gray<sup>2</sup> is the younger, effervescent and ebullient Mike Gray. Other, future Mike Gray's will be cubed or expressed as an ellipse.

### Copyrights & Surveying

Mike Gray<sup>2</sup>, PLS

A question was posed at the December 03 panel put on by our local chapter. It involved possible ownership of the plat of survey, copyright law and the file of information used to compile said map. It interested me enough to "Google" copyright laws. Amazingly enough when I typed in copyright laws it gave me the U.S. Copyright office. I know first try.

The first item I wanted to know about was if our plat was copyrightable. It turns out that it is. To quote the Copyright office guidelines "*Copyright protects "original works of authorship" that are fixed in a tangible form of expression. The fixation need not be directly perceptible so long as it may be communicated with the aid of a machine or device.*" It later lists examples of what items are considered copyrightable. The office lists that pictorial and graphic works are eligible and that the categories should be viewed very broadly. The plat therefore is a copyrightable medium. Information gathered may not be a copyrightable medium but the manner and style are.

The second item I want to address is what is needed to copyright your work. The short answer is nothing. Your work is your work. No registration is necessary. The Office does add that there are certain advantages to registering your work. Registering your work makes public your claim of copyright. It also is required before one files an infringement suit.

Lastly, I want to touch on ownership. I am not a lawyer but, I watch Boston Legal, Eli Stone, and Law and Order. I think I can put it best by example. I buy a book on how to step by step train a dog. I can use the techniques put forth in the book. I could not change a paragraph and call it Mike's dog training book. By purchasing the book I am allowed to use the property of the author. Circling the wagon, the point I am ineloquently trying to express is that it is your clients to use in the specific manner in which is intended and the information and the rights stay with the author. My example may be sophomoric, but to me this makes perfect sense. I also believe it is the same respect to which architects and engineers receive. One may wish to transfer his right of ownership of copyright. If this is your intent a document stating your intent to transfer ownership to your client is necessary.

Editors note: the foregoing article was used by permission.

## National Surveyors Week

Jack Dill, PLS

City of Springfield



From left to right:

Jack Dill, Mike Gray<sup>2</sup>, Mayor Thomas Carlson, Kevin Tyler, and Travis Dill.

March 15-21 is National Surveyors Week. Springfield Mayor Thomas Carlson signed a proclamation on March 3 to help commemorate the event.

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# Spiral Curve Descriptions

By Peter W. Stevens, PLS

The preparation of property descriptions that involve spiral curves is not a common problem encountered by most land surveyors. Spiral curves are not considered acceptable line types for property boundaries, but they can be found in highway centerline descriptions where they are often referenced for station/offset right-of-way calls.

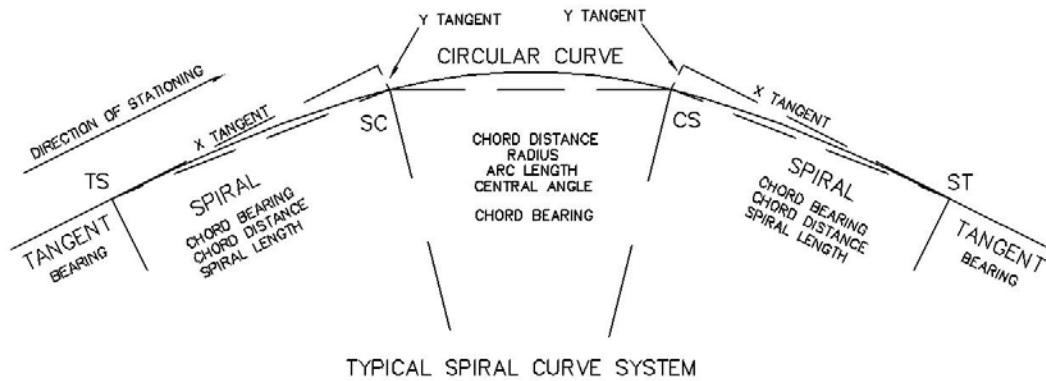
Working on projects for the Missouri Department of Transportation, I've been faced with the need to prepare descriptions of new highway alignments that include spiral curves. Looking to my reference books for guidance in describing spiral curves, I was surprised to find how little information was available. The examples of spiral curve descriptions from earlier MoDOT deeds were confusing. The descriptions included references to curve elements that were unfamiliar to me and were not easily found in my research. Also, they did not include information that other sources said were essential.

I decided to step back, conduct a deeper search for information, and determine for myself a satisfactory method of describing spiral curves. What follows is what I have discovered and my current method of describing these curves. I do not present this material as an expert on the subject, but as just another sojourner on the road to truth, sharing what he has found and inviting criticism and comment.

Please note that this is not a treatise on the mathematics of spirals. I leave that subject to those with calculus training. This exploration is solely for the preparation of descriptions. My knowledge of spiral calculations is not much greater than knowing what data is required to create a spiral in AutoCad, and I don't want to imply that I can address the mathematics of the subject.

That being said, let's first look at the basic geometry of highway curves. The accompanying spiral diagram shows the typical curve system used in highway centerlines; with a standard circular curve in the middle of the system and a spiral curve on each side. The spiral portions of the curve system are for smoothing the transition on high speed roads from tangent to curve, and are typically where the transition from a flat road bed cross section to the super elevation of the curve occurs.

The centerline enters the spiral from a tangent line at the TS (tangent-spiral) curve and proceeds tighter until its radius is equal to the radius of the circular curve at the SC (spiral-curve) centerline through the circular curve to the



centerline spiral from line at the (tangent-point). The starts with radius and to spiral and tighter radius is the radius central curve at the (spiral-point). The proceeds

CS (curve-spiral) point where it enters the exiting spiral, which is symmetrical with the entering spiral. The curve begins with the same radius as the central curve and spirals outward to an infinite radius at the ST (spiral-tangent) point.

This typical curve system can be modified with asymmetrical spirals on each side or even the elimination of one of the spirals, but this is rare. Typically, engineering design criteria determine the centerline layout and the surveyor is simply tasked with dealing with the results.

There are several types of spirals. The clothoid (or linear) spiral is used almost exclusively for highway curves in the United States and is the first choice in the Autocad spiral curve function. Although it may often be assumed, technically, one should define the type of spiral being used.

As with circular curves, there are essential curve elements required for establishing the spiral curve.

First; the direction of the tangent lines entering and exiting the curve system is required. As with a circular curve description, a spiral curve is assumed to be tangent to the line described just before entering the curve system. If it is not, the spiral curve should be noted as non-tangent, and the direction of what would be a tangent line entering the spiral must be noted. Unlike circular curves, noting the chord direction to orient the curve will not suffice, the mathematics require the direction of the tangent entering the spiral curve. Likewise, if the line described exiting the spiral curve system is not tangent to the spiral, a note describing the direction of what would be a tangent line to the spiral must be included. Similarly, if your centerline description begins at the TS point of the spiral, leaving the direction of the tangent entering the curve undefined, the tangent direction must be noted.

Second, the length of the spiral must be stated. Much as we often specify “an arc distance of” along a circular curve, it is wise to specify “a spiral length of” when stating the linear distance along the spiral curve.

Third, the horizontal relationship between the TS point and the SC point must be established. I believe that stating the direction and length of the long chord of the spiral is the simplest method. Other descriptions I have seen accomplish this by stating “...said spiral curve having a X tangent distance of 191.70 feet from the TS to the SC and a Y tangent offset of the SC of 8.03 feet”. After researching the topic, I found that the X tangent distance is the distance from the TS point, along an extension of the tangent line, to a point which is perpendicular to the SC point, and the Y tangent distance is the distance from that perpendicular point to the SC point. Since most surveyors do not often deal with spirals, the nomenclature used here might be confusing (it was to me!). Not only is the use of the long chord direction and length a more common concept to most surveyors, but calculating coordinates through a spiral curve centerline will be easier with one call through the spiral rather than two.

Last, the radius and orientation of the circular curve that the spiral leads into, or comes out of, needs to be stated. This information can be taken from the elements stated in describing the circular curve itself. The circular curve description must be treated as a non-tangent curve in that the orientation of the curve must be stated. Again, for convenience in calculations, I prefer to state the direction and distance of the long chord to orient the curve.

With these elements of the spirals included in the description, enough data is provided to draw the spiral curve and calculate the location of points along the line.

An example of a centerline description with the Point Of Beginning being at the TS point of a spiral curve (thus requiring a reference to the tangent direction) is:

*“...to the Point of Beginning, said point being designated as U.S. Route 60 centerline Tangent-Spiral station 254+34.93; thence southeasterly, along a clothoid spiral curve to the right (the bearing of the tangent entering said spiral curve is south 74 degrees 50 minutes 15 seconds east), said spiral curve having a 199.98 feet long chord which bears south 74 degrees 00 minutes 15 seconds east, a spiral length of 200.00 feet to centerline Spiral-Curve station 256+34.93; thence along a curve to the right, through a central angle of 34 degrees 28 minutes 16 seconds, with a radius of 2291.83 feet and a 1358.15 feet long chord which bears south 55 degrees 06 minutes 07 seconds east, an arc distance of 1378.85 feet to centerline Curve-Spiral station 270+13.78; thence southeasterly, along a clothoid spiral curve to the right, said spiral curve having a 199.98 feet long chord which bears south 36 degrees 11 minutes 59 seconds east, a spiral length of 200.00 feet to centerline Spiral-Tangent station 272+13.78; thence south 35 degrees 21 minutes 59 seconds east, 87.29 feet to centerline station 273+01.07.”*

Right-of-way descriptions written from centerlines with spiral curves present special challenges. Descriptions that use station and offset calls to locate right-of-way P.I. points should avoid offsets along the spiral portions of the curve systems where possible. When unavoidable, supplementing the station/offset reference with direction and distance calls along the right-of-way line will make future surveyor's lives easier.

Many centerline descriptions state a width of right-of-way from the centerline, allowing for a simple offset of the centerline to create the right-of-way line. As stated earlier, spiral curves are not recommended for property lines, including right-of-way lines. I'm not sure what kind of curve one gets if one offsets a clothoid spiral, but it will not be a clothoid spiral that fits with the corresponding tangent and central circular curves if they, too, are offset (any mathematicians willing to expound upon this?). I have come upon right-of-way descriptions that were written in this manner. Fortunately, expanded right-of-way takings have swallowed up some of them and so they have not survived to vex the next surveyor.

So this is what I have learned in dealing with spiral curve descriptions. I am putting it out there for any who might find it useful, and I welcome any criticisms or comments readers may have.

Peter W. Stevens, PLS

# MINUTES FROM FEBRUARY 10, 2009

## ATTENDANCE

Jack Dill, Travis Dill, Shane Machin, Gary Bockman, Kevin Tyler, Pete Stevens, Mike Gray<sup>2</sup>, Christopher Strong, Greg Maynard, Forrest Maynard, Paul Taylor

### I. Call to order

Kevin Tyler called to order the regular meeting of the **Ozark Chapter MSPS** at 6 pm on 2/10 at Western Sizzlin.

### II. Approval of minutes from last meeting

Minutes were approved from February.

### III. Old Business

There was discussion and a general consensus that we should acquire better swag for Farmfest. A 1 meter “yard stick” was suggested. Dick Cox may have some merchandise for use. Chris Wickern intends to get a booth at the State Fair.

Peter Stevens and Gary Bockman commented on the state specific examination questions they reviewed. Some of the questions seemed vague and they made recommendations.

Mike Gray<sup>1</sup> sent an email to Jack Dill indicating that sample state specific questions are available on the Mo. Board website and that NCEES has sample tests on their website for a small fee. He has had conversations with MSPS and Dick Elgin about a 1 day seminar for test takers. Maybe for the Fall exam. Also, there is \$500 scholarship for non-traditional students through MSPS.

Gary Bockman went to the Planning and Development meeting at the City of Springfield and reported that it was simply an overview of the review process.

### IV. New business

A list of candidates has been sent to the Governor for replacements to the Mo. Board. Mike Gray's<sup>1</sup> term has expired and a replacement may be named. There is some confusion about who may serve on the Board depending on if their nomination has been allowed to expire by the Governors office. Something like that... I was confused.

Discussion of MODOT plans which are occasionally in different units (sometimes feet, sometimes meters). Also, Kansas City is a dangerous place for a MODOT truck... apparently.

Gary Bockman reported that Darrell Pratt is writing a letter to MODOT in regards to having surveys conform to Missouri Minimum Standards. There is a checklist for them to follow that would ease conformity.

Surveyors Week is March 15-21. A meeting will be arranged with Mayor Carlson for signing a proclamation.

There is a need to get updated email addresses from members. It is our primary distribution for the newsletter.

It was suggested that Safety would be a good topic for our Bar B Q in July. Other suggestions are welcome.

It was mentioned that Jeff Lucas might be a speaker at the State Annual meeting this year. There was no jubilation at this news.

The MODOT GPS system is almost ready. Paul Taylor mentioned that it might “go live” as soon as March 10. There was jubilation at this news.

### **Adjournment**

**Kevin Tyler** adjourned the meeting.



We should try to smile next year. You'd think we were going to be shot after the photo is taken. Except for Travis, he laughs in the face of danger. Thanks to Mayor Carlson for taking the time to do this for us this year. Special thanks to Anita Cotter for setting it all up.

**Invitation for membership**

Ozark Chapter MSPS annual dues are as Follows:

Member \$20.00 Student Member \$5.00

Associate Member \$5.00

Sustaining Member \$30.00

*Education Committee:*

*Peter Stevens - Chairman*

*pstevens@mai-eng.com*

*Web Page Committee:*

*Steve Nelson, Gaylon Smith, Dick Cox*

Please remit registration and fees to:

**OZARK CHAPTER MSPS**

**Jack Dill**

**16 Sherwood**

**Buffalo, MO 65622 345-6508 or 880-5382cell**

**E-mail: [secretary@ozarksurveyor.org](mailto:secretary@ozarksurveyor.org)**

**Kevin Tyler- President**

**Paul Taylor – President-elect**

**Mike Gray – Vice-President**

**Jack Dill – Secretary-Treasurer**

**Directors – Stephen Nelson**

**Ref Bagley**

**Gaylon Smith**

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