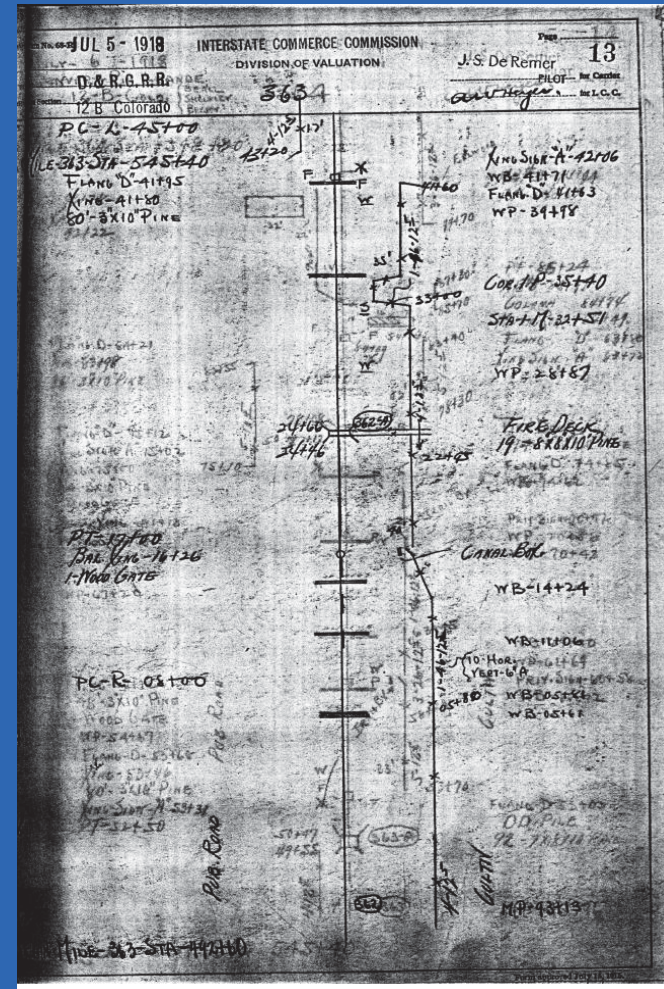
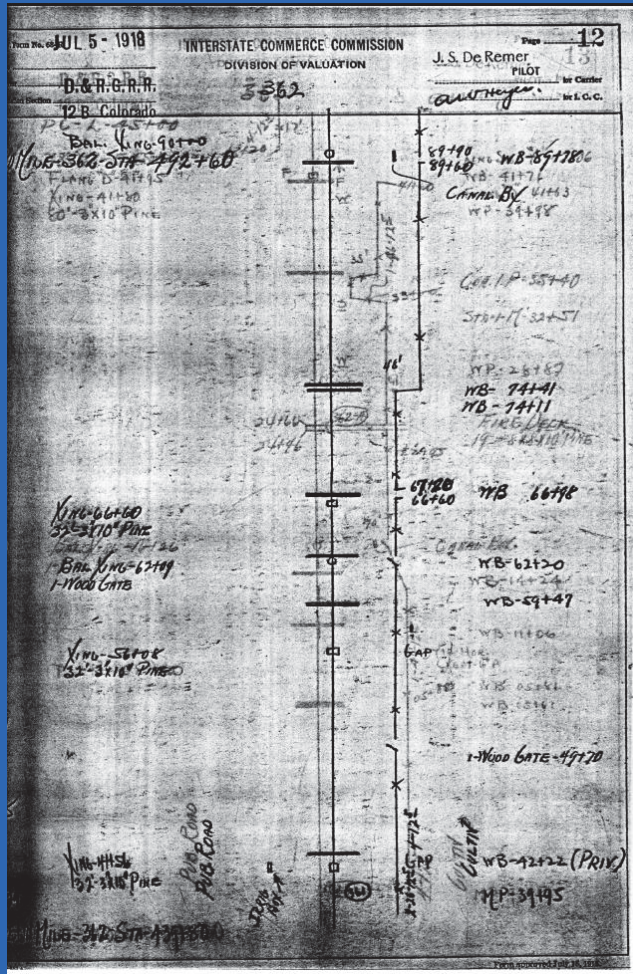


ICC Chaining Notes & Location Sketch (D&RG Ouray Branch - Colorado 1918)



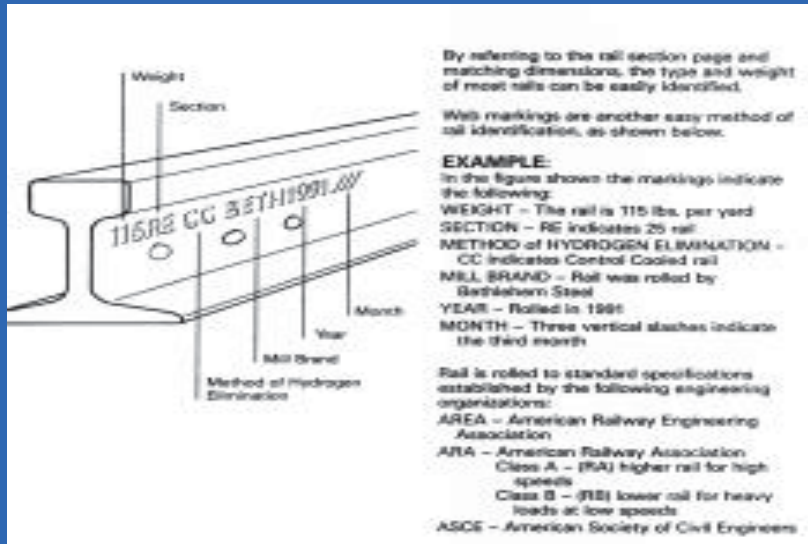


Pop Quiz!

What goes on here?



Rail



Field crews picking this data up?
Rail data supplied in your electronic files

Recovering Railroad Records

- Mapping (AREMA C-1, C-16)

MODULE 4

- **ICC Valuation Maps**
 - ICC Act of 1913 / Balanced Taxation
 - Evolution of Alignment (Line changes)
 - Variation in Cadastre, Original Purpose of Maps
 - Format & ICC Instructions
- **Profile Maps**
 - Changes in Grades
 - High Water Data
 - “engineer’s profile chaining”



Recovering Railroad Records (Sources)

- Records (AREMA C-16, C-11)
- Standard Plans
 - Respecting the past
 - Retracement clues
 - Old monumentation / what it was
 - How it was put together
- Bridge records
- Fence records
- Crossing records (public/private/company)
- Rail record / pipe & culvert record
- Crossing frog record
- Clearance record
 - safety and alignment issues
- Building records
- Curve record
 - Evidence of change, line changes

Iowa Fence Law

- 327G.3 Railway fences required.
 - All railway corporations owning or operating a line of railway within the state, shall construct, maintain, and keep in repair a fence on each side of the right of way, to prevent livestock getting upon the tracks.
[C97, §2057; S13, §2057; C24, 27, 31, 35, 39, § 8001; C46, 50, 54, 58, 62, 66, 71, 73, 75, §478.2; C77, 79, 81, §327G.3]
 - 327G.4 Specifications.
 - All fences shall be not less than fifty-four inches high and may be of any of the following types:
 - 1. Not less than five barbed wires, properly spaced.
 - 2. Not less than three barbed wires above and not less than twenty-four inches of woven wire below.
 - 3. Entirely of woven wire.
 - 4. Five boards properly spaced.
 - 5. Any other type which the fence viewers of any township through which it passes may determine as efficient as any of the above types.
 - Each of the above types shall be securely nailed to posts firmly set, not more than twenty feet apart for the first three types, nor more than eight feet apart for the fourth.
[C97, §2057; S13, §2057; C24, 27, 31, 35, 39, § 8003; C46, 50, 54, 58, 62, 66, 71, 73, 75, §478.4; C77, 79, 81, §327G.4]
 - fences 327G.5 Hog-tight fences .
 - When any person owning land abutting on the right of way is maintaining a hog-tight fence on all sides thereof for any division of such land except along such right of way, the railway company owning such right of way shall, on written request of the landowner, make such right of way fence along such enclosed land hog-tight by the addition of barbed or woven wire or other equally efficient means.
[S13, §2057; C24, 27, 31, 35, 39, § 8004; C46, 50, 54, 58, 62, 66, 71, 73, 75, §478.5; C77, 79, 81, §327G.5]
 - fence 327G.6 Failure to fence .
 - Any corporation operating a railway and failing to fence its right of way shall be liable to the owner of any stock killed or injured by reason of the want of such fence for the full amount of the damages sustained by the owner, unless it was occasioned by the willful act of such owner or the owner's agent; and to recover the same it shall only be necessary for the owner to prove the loss of or injury to the owner's property.
[C73, §1289; C97, §2055; C24, 27, 31, 35, 39, § 8005; C46, 50, 54, 58, 62, 66, 71, 73, 75, §478.6; C77, 79, 81, §327G.6]
 - 327G.7 Double damages.
 - If such corporation fails or neglects to pay such damages within ninety days after notice in writing that a loss or injury has occurred, accompanied by an affidavit thereof, served upon any officer or station or ticket agent employed by said corporation in the county where such loss or injury occurred, such owner shall be entitled to recover from the corporation double the amount of damages actually sustained by the owner.
[C73, §1289; C97, §2055; C24, 27, 31, 35, 39, § 8006; C46, 50, 54, 58, 62, 66, 71, 73, 75, §478.7; C77, 79, 81, §327G.7]
 - 327G.8 Laws and local regulations not applicable.
 - No law of the state or any local or police regulations of any county, township or city, relating to the restraint of domestic animals, or in relation to the fences of farmers or landowners, shall be applicable to railway rights of way, unless specifically so stated in such law and regulation.
[C73, §1289; C97, §2055; C24, 27, 31, 35, 39, § 8007; C46, 50, 54, 58, 62, 66, 71, 73, 75, §478.8; C77, 79, 81, §327G.8]
 - fence 327G.9 Failure to fence - general penalty.
 - If the railroad corporation refuses or neglects to comply with any provision of this chapter relating to the fencing of the tracks, such railroad corporation shall, upon conviction, be subject to a schedule "two" penalty and every thirty days' continuance of such refusal or neglect shall constitute a separate and distinct offense.
[C97, §2058; C24, 27, 31, 35, 39, § 8009; C46, 50, 54, 58, 62, 66, 71, 73, 75, §478.10; C77, 79, 81, §327G.9]
 - See § [327C.5](#)
 - 327G.10 Killing of stock - interpretative clause.
 - Nothing herein contained shall be construed to relieve the corporation from liability arising from the killing or maiming of livestock on said track or right of way by its negligence or that of its employees, nor shall anything in this chapter interfere with the right of open or private crossings, or with the right of persons to such crossings, nor in any way limit or qualify the liability of any corporation or person owning or operating a railway that fails to fence the same against livestock running at large for any stock injured or killed by reason of the want of such fence .
[C97, §2058; C24, 27, 31, 35, 39, § 8010; C46, 50, 54, 58, 62, 66, 71, 73, 75, §478.11; C77, 79, 81, §327G.10]

Evidence & Data Collection

MODULE 10

- Rail (AREMA C-4)
- Hierarchy of typical railroad control
- Who owns what? (of joint lines, union railroads, trackage rights and such...)
- Sources: Where to find?



Reference Material/Supporting Documents

- The Railroads (Current Data & CADD updates)
- The Courthouse (amazing stories of what is on hand without their knowledge!, Careless map storage)
- IaDOT Railroad Section (excellent base section on website)
- Iowa State Archives – Des Moines
- NARA (National Archives & Records Administration, Rockville, MD) **RIP-91**- copies to be reprinted 2/07?
- Mid Continent Railway Historical Society - North Freedom, WI
<http://www.midcontinent.org> / Don Ginter, archivist
- University of Iowa Main Library / Special Collection (CRIP)
- Mercantile Library/Barriger Collection (UM-StL) (Wabash)

Researchmanship

- Mapping, records, standards and contracts.....
- ICC Federal Mandate, Tax Basis
- GLO/BLM Filing Maps
- R/W & Track Maps, Track Charts
- Additional RR Cadastral Mapping
- Land Schedules



Researchmanship

- Bridge Records
- Elkins Act Contracts
- Building Records
- Closeouts (AFE's AFR's)
- Secretary's Office (deed & contract)
- Standard plans
- Chief Engineer's Standard Instructions
- AREMA Manual



Researchmanship

- Track charts (schematics)
- Pipeline/water/wells/fueling facility diagrams and handwritten records
- Lease & Contract/ License Agreements
- Permits/ File Records Folders (UPRR)
- Location Engineer's Profile Maps
- Fence/Crossing/Sidetrack/ Clearance

TIME CHECK / HALF WAY MARK...

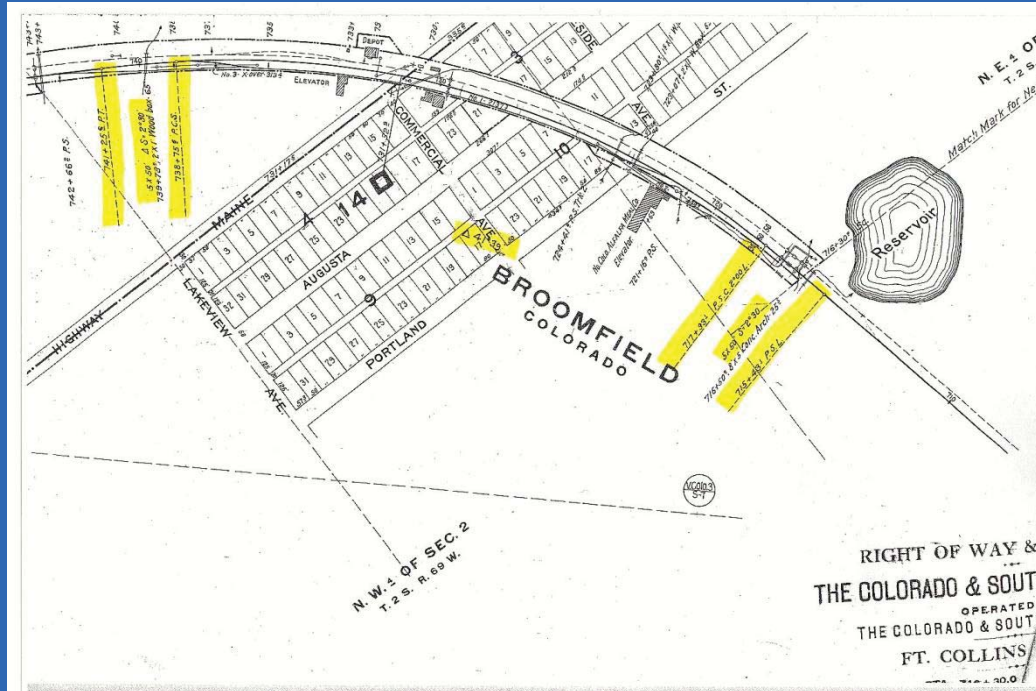


Curves (AREMA C-5, C27)

MODULE 6

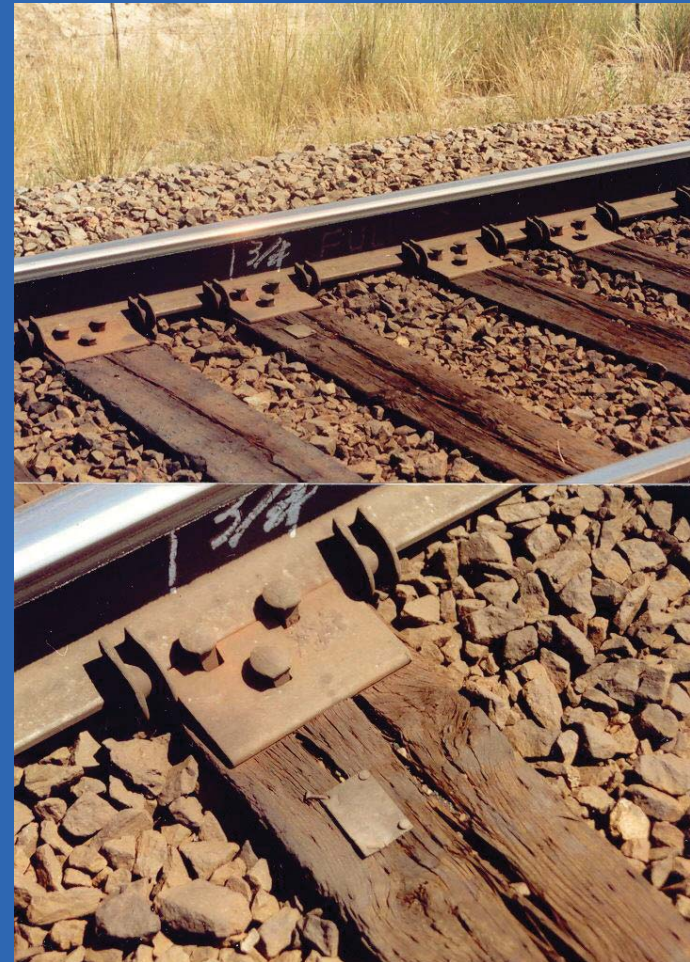
- Curve Definition (Arc vs. Chord)
- Spiral Curve
 - Talbot 10-Chord
 - Searles
 - Tapers
 - (The great passenger train wars, “Speed is King” between NYC & Chicago circa 1890-1910, especially in Michigan and Indiana - CSS & SB speed merchants)
- Stringline Solution (62 Foot Chord)
- Machine Curves (understanding what a machine does, how it “thinks” - Chord offsets and what a plotted curve looks like (Fairmont [Canron & Jackson] & Plasser typical machines)
- Crosslevel / Profile grade line in curves
- Field Practice (marking, tags, intent)

Searles Spiral Notation



- Curve in the field is anything BUT the curve on the map (Use 3-Point on a Curve Solution and be prepared to dance with the devil in survey hell!)
- Searles vs. AREMA / AREA 10-Chord Spiral
- The track may show spiral data on the map, but the right-of-way is most likely NOT spiraled (99% of the time)...Look for the original intent!

Curve Tags / Spiral Parts



String Line Solution and Machine Curves

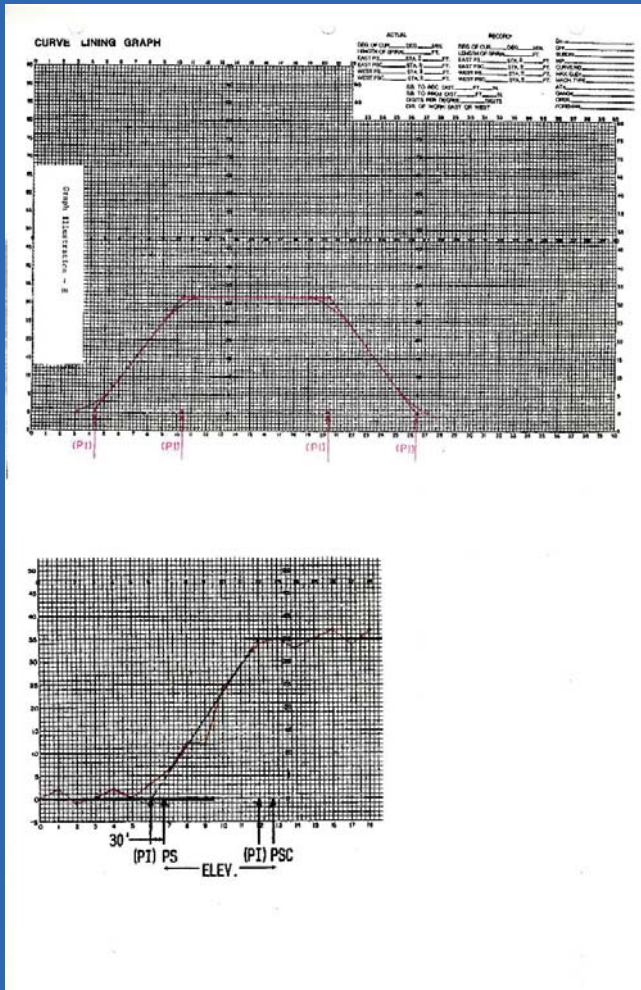
- String line solution and machine graphed curves smooth the curve given existing track conditions...
- These curves are not engineering or survey correct.
- Over time, curves tend to get elongated, have doglegs at the ends & main body of curve gets pulled to inside of cut/fill



Track Liners



Track Liners *continued*



Plasser Continuous Action Tamper

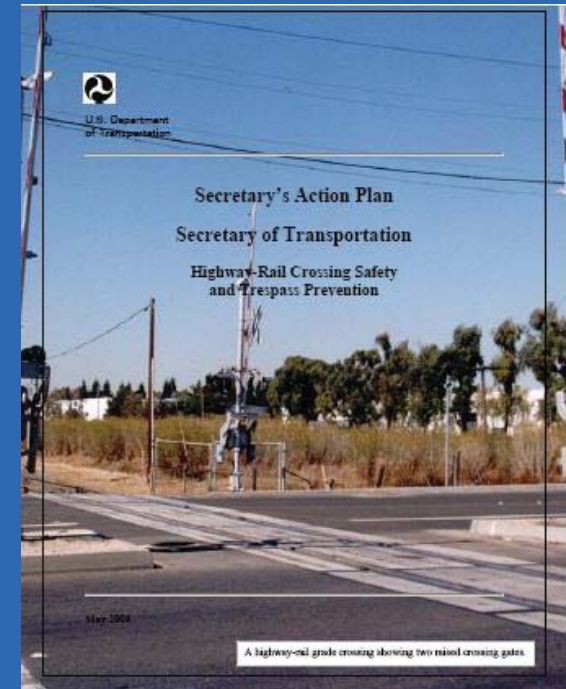
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Design & Technical Considerations for Surveyors & Civil Engineers

MODULE 9

- Road Crossing (AREMA C-5)
- Public Works Engineers
- Local PUC's and State Railroad engineers
- Implications from AREMA /ASHTO Joint Standard Policy on Geometric Design of Highways and Streets - 1994", Chapter IX - At Grade Intersections/Railroad Crossings, pp. 793-802
- Federal Push to Eliminate At-Grade Crossings (FRA 1994 Rail-Highway Safety Action Plan), Eliminate 25% X-ings by 2000 <http://ntl.bts.gov/DOCS/APSP.html>
- Implied liability of locating or reconstructing road crossing in a given area with bad profile/alignment/vision distance, etc. or just staking for construction by others
- Train Horn Rule implications



Signal Implications

AREMA C-36, C-37, C-38



- Train Horn Rule Implications
<http://safetydata.fra.dot.gov/OfficeofSafety/Default.asp>
- Vision Distances
- Upcoming Federal Private Crossing rules(s) & comment (8/29/06)
<http://safetydata.fra.dot.gov/OfficeofSafety/Default.asp>