

# Outline

## **“JOY OF GEODETICS”**

### 8-Part Geodetic Survey Markers Educational Series

390 PowerPoint Slides, 602 Photos & Diagrams, 29 References

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#### **Part I** – INTRODUCTION TO GEODETIC SURVEY MARKERS, NGS, AND THE USPS RECOVERY PROGRAM (44 Slides, 36 Photos/Diagrams)

1. USPS Geodetic Marker Program
2. What are Geodetic Markers
3. Marker Recovery & Reporting Steps
4. Coast Survey, NGS, and NOAA
5. Geodetic Datums & Control Types
6. How did Markers get Placed?
7. Surveying Methods Used (Horizontal and Vertical)
8. The National Spatial Reference System
9. CORS Modernization Program

#### **Part II** – GEODETIC MARKER REGISTRY AND PHYSICAL TYPES OF MARKERS (29 Slides, 45 Photos/Diagrams)

1. NGS Registry (PID & Designation)
2. Why is PID Important
3. Physical Types of Markers
  - a) Disks
  - b) Pipe Caps
  - c) Rods
  - d) Rivets
  - e) Nails
  - f) Spikes
  - g) Bolts
  - h) Pillars
  - i) Unconventional
  - j) CORS (GPS Stations)

#### **Part III** – FUNCTIONAL CLASSIFICATION OF DISK MARKERS, PRIMARY INSTALLING AGENCIES, AND DISK EXAMPLES (74 Slides, 117 Photos/Diagrams)

1. About Disk Marks
2. Difference between the Disk Stamping and Disk Casting

3. Primary U.S. Disk Installing Agencies (NGS, Prior NGS and USGS)
4. First Disks
5. Disk Mark Functional Classifications
  - A. Primarily Horizontal Disk Marks
    - a) Horizontal Controls
    - b) Triangulation Stations
    - c) Reference Marks
    - d) Azimuth Marks
    - e) Traverse Stations
    - f) Magnetic Stations
    - g) Calibration Stations
  - B. Primarily Vertical Disk Marks
    - a) Bench Marks
    - b) Vertical Control Marks
    - c) Tidal Bench Marks
    - d) Gaging Stations
    - e) Hydrographic Stations
    - f) Topographic Stations
  - C. Geodetic Control Disk Marks (New)
  - D. Specialty Disk Marks
    - a) Magnetic Stations
    - b) Gravity Stations
  - E. US / State Cooperative Disc Marks
    - a) USC&GS and State Survey
    - b) USGS Cooperation with the State of

**Part IV** – OTHER INSTALLING AGENCIES AND DISK EXAMPLES (54 Slides, 119 Photos/Diagrams)

1. Other U.S. Agencies Installed Disk
  - a) U.S. General Land Office
  - b) U.S. Bureau of Land Management
  - c) U.S. Reclamation Service
  - d) U.S. National Parks Service
  - e) U.S. Army Corps of Engineers (USACE)
  - f) U.S. Lake Survey
  - g) U.S. Reclamation Service
  - h) U.S. Supreme Court
  - i) Tennessee Valley Authority
  - j) U.S. Department of Agriculture
2. State Installed Disk Marks
  - a) Arizona

- b) California & Colorado
  - c) Florida
  - d) Indiana & New Jersey
  - e) North Carolina (Organized by Disk Functional Type)
  - f) Ohio, Oregon
  - g) Pennsylvania & South Dakota
  - h) South Carolina
  - i) Virginia & Wisconsin
  - j) Washington State
- 3. County Installed Disk Marks
- 4. District Installed Disk Marks
- 5. City Installed Disc Disk Marks
- 6. Non-Government Agency Installed Disc Marks
- 7. Commemorative Disk Marks

**Part V** – WHERE GEODETIC MARKERS ARE PLACED (38 Slides, 72 Photos/Diagrams)

- 1. At Ground Level, Recessed, or Elevated
- 2. In Casings (PVC or Metal)
- 3. In Rocks and Rock Outcrops
- 4. In Concrete or Stone Pillars
- 5. In Sidewalks, Steps and Stoops
- 6. In Curbs and Curb Gutters
- 7. In Traffic Islands
- 8. In Walls of Stone or Brick
- 9. In Bridge Wingwalls, Abutments, & Railings
- 10. In Culvert Headwalls
- 11. Top of Spiers, Towers & Tanks
- 12. CORS GPS Sites

**Module VI** – PLANNING AND CONDUCTING GEODETIC MARKER RECOVERYS / PHOTO REQUIREMENTS, AND VISUAL AIDS (75 Slides, 111 Photos/Diagrams)

- 1. National Geodetic Survey Data Explorer
  - a) View Marks in a Location of Interest
  - b) Zoom in to a Mark of Interest
  - c) Optional Satellite View
  - d) Bring up Mark PID and Designation
  - e) Bring up Mark Datasheet
- 2. Relevant Data Sheet Sections for Mark Recovery
  - a) Designation & PID
  - b) Coordinates & Elevation
  - c) Photographs Link

- d) Marker Type, Setting, & Stamping
- e) History Section (Date Last Recovered)
- f) Mark Location Information Section
- 3. Handheld GPS and Smartphone Accuracy
- 4. Coordinates Search and Display Guidelines
- 5. Photo Requirements for Submission Report
- 6. Smartphone Apps for Locating Marks
- 7. Smartphone Apps for Picture Taking (Date, Time, Coordinates, & Direction Stamps)
- 8. Date and Coordinates record in photo "Properties"
- 9. Picture Taking Options and Recommendations
- 10. Recommended Items and Equipment for Recoveries
- 11. Safety Items and Dangers to Avoid in Field
- 12. Visual Aids for Marker Recovery
  - a) Witness Posts (Geodetic Marker Signs)
  - b) Witness Tags
  - c) Vinyl Cloth Locators
  - d) Painted Arrows
- 13. Did I Find the Right Disk?

**Part VII** – PROCESSING PHOTOS, DETERMINING MARK CLASSIFICATIONS, AND REPORTING RECOVERIES (44 Slides, 42 Photos/Diagrams)

- 1. General Reporting Requirements
- 2. Mark Classifications
  - a. Good
  - b. Poor (Damaged and Examples)
  - c. Destroyed (and Examples)
  - d. Not Found Not Recovered
- 3. Preparing pictures for a Marker Report
  - a. Transfer Photos to Computer
  - b. Rename Photos (Optionally to NGS standards)
  - c. Picture Size Requirements
  - d. Determining File Size and Pixel Size
  - e. Resize Photos to USPS and Optionally to NGS standards
  - f. Upload Photos to a Report
- 4. Where to Submit a Marker Report
- 5. Preparing a Marker Report
- 6. Submitting a Marker Report
  - a. First Page (Who and When)
  - b. Pages 2-6 (Report up to 5 Marks & Upload Photos)
  - c. Last Page (Submit Report)
- 7. Submitting Destroyed Geographic Marks
- 8. Mark Recovery Credits
- 9. Honor Roll Requirements

## **Part VIII** – GDS MEMORABLE GEODETIC RECOVERIES (35 Slides, 60 Photos/Diagrams)

1. First in Flight
2. George Washington
3. Atop the Beartooth (Highest Mark)
4. Seaboard Airline Railroad Marks (1918 Mon)
5. Earl Smith, Surveyor
6. NC Meridian Boundary Pillars (1895 Mon)
7. Kayak to NC/SC Boundary Mark
8. Giant Sundial UNC
9. Rare Magnetic Mark
10. No. 1 NC-VA Boundary Marker (First Survey 1728)
11. Bodie Island North Base (Oldest Mark, 1848)
12. Benchmark in Boone, NC
13. CORS Stations

## **References** – References got Parts I-VIII (6 Slides)

14. References
15. Photographer Credits References
16. JOG Revisions Summary