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The most recent issues of this journal were published in December 1976, September 1977, and November 1978.

TECHNICAL NOTES

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INFORMATION RETRIEVAL

The key words, abstract, and reference "cards" for each article in this Journal represent part of the ASCE participation in the EJC information retrieval plan. The retrieval data are placed herein so that each can be cut out, placed on a 3 × 5 card and given an accession number for the user's file. The accession number is then entered on key word cards so that the user can subsequently match key words to choose the articles he wishes. Details of this program were given in an August, 1962 article in CIVIL ENGINEERING, reprints of which are available on request to ASCE headquarters.

14946 LAYOUT TECHNIQUES FOR LITTLE BLUE RUN DAM

KEY WORDS: Construction; **Construction control;** Construction procedure; **Dams (rockfill);** Layout; **Measuring instruments; Transits**

ABSTRACT: A method of performing stakeout at Little Blue Run Dam was used to minimize interference with construction equipment and still produce the required accuracy at reasonable cost. Stakeout was performed by laying out the curved axis or offset curve by the normal transit, tape, and deflection angle method. The next step was to find the location of the slope stake by trial and error with the use of a self-reducing tacheometer to give the radial line, distance and difference in elevation.

REFERENCE: Church, Duane R., "Layout Techniques for Little Blue Run Dam," *Journal of the Surveying and Mapping Division,* ASCE, Vol. 105, No. SU1, **Proc. Paper 14946**, November, 1979, pp. 1-9

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14950 FUTURE ACTIVITIES IN ENGINEERING SURVEYING

KEY WORDS: **Coastal plains;** Manuals; Pipelines; **Subsidence; Surveys; Urban studies**

ABSTRACT: The engineer-surveyor faces critical problems in urban, coastal zone, pipeline, subsidence and other types of survey operations. Radical changes in instrumentation and techniques have altered the traditional role of the engineer. He must continuously study, monitor and analyze new developments for possible use in solving current survey problems. The Engineering Surveying Committee, now revising a general manual on Engineering Surveying and a manual on Highway and Bridge Surveys, must prepare to publish additional manuals to replace publications rendered obsolete by the recent technological changes in survey practice.

REFERENCE: Burns, Joseph P., "Future Activities in Engineering Surveying," *Journal of the Surveying and Mapping Division,* ASCE, Vol. 105, No. SU1, **Proc. Paper 14950**, November, 1979, pp. 11-14

14951 PIPELINES—POSITIONING AND SURVEY PROBLEMS

KEY WORDS: Diving; **Fathometers;** Instrumentation; Lasers; Outfall sewers; **Pipelines; Positioning; Profile measurement;** Ranges; Scuba diving; **Side looking radar; Sonar; Surveys; Underwater surveys**

ABSTRACT: The first section of the paper describes the goals and objectives and some typical surveying problems encountered in the planning stages and, similarly, in the next two sections, design and construction surveys are covered. A planning/design survey for a river crossing is described in the fourth section. In the fifth section, solutions to specific problems encountered in planning and design surveys of outfall lines are described.

REFERENCE: Hole, Stanley W., "Pipelines—Positioning and Survey Problems," *Journal of the Surveying and Mapping Division,* ASCE, Vol. 105, No. SU1, **Proc. Paper 14951**, November, 1979, pp. 15-22

14953 WETLAND SURVEYING AND MAPPING

KEY WORDS: Hydrography; **Mapping;** Marshes; **Resection; Sextants; Surveying;** Swamps; **Wetlands**

ABSTRACT: Wetland definitions are reviewed and procedures explained for surveying and mapping wetlands. Satellite multi-spectral scanners, aerial photography, and land survey methods are mentioned. Survey of the water boundary by small boat is considered in detail with emphasis on position fixing by horizontal sextant angles. Mapping requirements are stated for water depth and plant species as well as horizontal topography.

REFERENCE: Blair, Carvel, "Wetland Surveying and Mapping," *Journal of the Surveying and Mapping Division,* ASCE, Vol. 105, No. SU1, **Proc. Paper 14953,** November, 1979, pp. 23-34

14956 PROPOSED RIGHT-OF-WAY POLICY

KEY WORDS: **Boundaries (property);** Budgeting; **Civil engineers; Financing;** Information systems; Land surveys; Legal factors; Litigation; **Management;** Mapping; Monuments; **Professional practice;** Right-of-way; **Transportation**

ABSTRACT: Chief executive officers of organizations that purchase and manage right-of-way have a management obligation to budget resources for professional land survey engineering. Investigations by professional societies have demonstrated that current practice by these organizations is inadequate and no longer tolerable to the organization or its abutting neighbors. The high value of land leads to litigation over questionable boundaries. The resultant legal expenses are often greater than the cost of proper land survey engineering—sometimes greater than the value of the land. Record search, field measurement, monumentation, and drafting of legal descriptions should be equal to that required for a land title survey of any tract in the same locality. This professional work should be performed under the supervision of a person registered or licensed to practice land surveying in the jurisdictional area within which the property is located. Every right-of-way plat should be recorded in the same public office that all other land title records are kept.

REFERENCE: Wambach, William T., Jr., Chmn., "Proposed Right-of-Way Policy," *Journal of the Surveying and Mapping Division,* ASCE, Vol. 105, No. SU1, **Proc. Paper 14956,** November, 1979, pp. 35-41

14957 SURVEYING AND MAPPING RESEARCH: 1978—1988

KEY WORDS: **Automation;** Digital systems; Forecasting; **Geodetic surveys; Holography; Hydrographic surveys;** Inertial energy systems; **Land surveys; Mapping; Oceanographic surveys; Photogrammetry;** Remote sensing; **Research;** Surveying; **Topographic surveys**

ABSTRACT: As background for forecasts of surveying and mapping research in the 1978-1988 decade, the experience of the 1965-1978 period is reviewed. Prognostications for the next decade by several authors in the fields of land surveys, geodetic surveys, engineering surveys, and oceanographic and hydrographic surveys are discussed. Major research objectives in each field are spelled out and a prediction is presented for each objective. Predictions include: development of photogrammetric survey standards; use of inertiial-surveying systems; development of economical minicomputers and automated plotters; use of satellites for position determination; adoption of the North American datum of 1983; implementation of a nationwide digital cartographic data base; introduction of holographic techniques; conversion to metric measurements on cartographic products; and increased automation of cartographic procedures.

REFERENCE: Thompson, Morris M., "Surveying and Mapping Research 1978-1988: An Overview," *Journal of the Surveying and Mapping Division,* ASCE, Vol. 105, No. SU1, **Proc. Paper 14957,** November, 1979, pp. 43-49

14958 MAPPING LITTLE BLUE RUN IMPOUNDMENT PROJECT

KEY WORDS: Construction; Control; Design; **Mapping;** Planning; **Reservoirs;** Scale (ratio); Scheduling

ABSTRACT: Project mapping may require substantial time when planning and scheduling the design and construction activities for a large project. The multifaceted Little Blue Run Stackwaste Impoundment project involved design and construction of a dam, reservoir, pumphouse, pipeline, and roads, all of which were completed on a fast-track schedule. Heavy summer foliage and a variety of immediate project needs required a flexible and innovative program to reduce project mapping. The basic approach involved utilizing existing control, photography, and mapping (where possible). By supplementing existing photography with new photography, judiciously choosing map scales, and employing a variety of mapping techniques, adequate mapping was produced for all project needs on schedule and within budget.

REFERENCE: Poe, Roger C., and Okorn, Dennis W., "Mapping Little Blue Run Impoundment Project," *Journal of the Surveying and Mapping Division,* ASCE, Vol. 105, No. SU1, **Proc. Paper 14958**, November, 1979, pp. 51-65

14955 VIRTUAL WORK OF TRILATERATION NETS

KEY WORDS: **Adjustment;** Computation; Deformation; Framed structures; Geodesy; **Geodetic surveys; Least squares method;** Redundancy; Structural engineering; Surveying; **Triangulation; Work**

ABSTRACT: One imagines the measured distances as elastic members in an internally redundant framework. The redundant members are thought to have fabrication errors equal to the differences between the measured and the calculated lengths of these redundant lines. If such differences, called closing errors, are not zeros, forces must be applied to fit the redundant members in position. To find these forces, the redundant members are cut and replaced by unit virtual loads. It is shown that the forces developed in the members due to each of these unit loads are the coefficients of the corrections in the condition equations. They can be determined by statical methods either graphically or analytically. A mathematical check is given to ensure the correct calculations of these coefficients. The final force in each member causes a change in its length, which is in fact the required correction of the corresponding distance.

REFERENCE: Danial, Naguib F., "Virtual Work Adjustment of Trilateration Nets," *Journal of the Surveying and Mapping Division,* ASCE, Vol. 105, No. SU1, **Proc. Paper 14955**, November, 1979, pp. 67-83

14961 LAND SURVEYING RESEARCH NEEDS—NEXT DECADE

KEY WORDS: **Computers; Education; Engineering education; Forecasting;** Instrumentation; **Land surveys; Land usage;** Monuments; Photogrammetry; **Registration**

ABSTRACT: The Land Surveying Committee of ASCE contributed to the attempts to identify land surveying research needs for the next decade. Areas covered included: (1)Land identification systems; (2)monumentation and legal aspects; (3)land surveying methods and survey control; (4)instrumentation: and (5)education and professional registration. Only exceptionally high or below normal progress items are highlighted. Implementation of a universal land identification system is lagging and is singled out as the most significant problem needing attention and research for the next decade. Land survey monuments will be protected and more state laws will be proliferated in all phases of the survey profession. Systems are available that will become economical and greatly change surveying procedures. Surveying instruments will continue to become smaller, lighter, less expensive, with greater capability. The education and professional registration of the land surveyor will be greatly upgraded.

REFERENCE: Snedeker, Roscoe B., "Land Surveying Research Needs: The Next Decade," *Journal of the Surveying and Mapping Division,* ASCE, Vol. 105, No. SU1, **Proc. Paper 14961**, November, 1979, pp. 85-91

14997 GEODETIC SURVEYING: THE NEXT DECADE

KEY WORDS: **Doppler systems; Doppler tracking; Geodesy; Geodetic surveys;** Mapping; Navigation; Satellites; Spacecraft instruments; Surveying

ABSTRACT: By the end of the next decade (1988), most large-area geodetic surveys will probably be made using a satellite Doppler positioning system, an inertial positioning system, or some combination of the two systems. The Doppler system is capable of determining the absolute, three-dimensional position of any point on the earth and it can also be used to obtain relative positions. Using data from multiple satellite passes and refined data reduction techniques, it is possible to obtain accuracies of 20 cm or better. The development of the Global Positioning System (GPS) in the 1980's is expected to improve position accuracies to 10 cm or better. The inertial system is capable of very large, rapid surveys with position accuracies of 20 cm or better relative to the control used. In addition, deflections of the vertical to one second of arc and gravity anomalies to one milligal can also be obtained. Despite relatively large costs, both systems have proven to be cost-effective because of their very high productivities.

REFERENCE: Mezera, David F., "Geodetic Surveying: The Next Decade," *Journal of the Surveying and Mapping Division,* ASCE, Vol. 105, No. SU1, **Proc. Paper 14997,** November, 1979, pp. 93-108