

EASTERN SNOW CONFERENCE RESEARCH COMMITTEE

List of Studies in Progress

1. PROPERTIES OF SNOW AND ICE

72-1 OVER-SNOW TRAFFICABILITY. -- G. Abele, USA CRREL, Hanover, N.H. 03755

Develop a simple, portable device for rapidly measuring snow strength characteristics pertinent to snow trafficability. Assist U.S. Army Arctic Test Center in developing a standard test methodology for evaluating over-snow mobility of vehicles. A prototype of the device was tested in Alaska in 1971. A modified device is being constructed for 1972 tests. Snow strength data obtained with the device are comparable to data obtained with the bevameter.

Abele, G. and D. Mouret. 1971. Arctic Trafficability Research Studies. U.S. Army Arctic Test Center, USA TECOM Project No. 9-CO-008-000-006.

Parrott, W. H., H. T. Ueda and G. Abele. 1972. A Portable Instrument for Determining Snow Characteristics Related to Trafficability. Proc. 4th International Conference of the Int. Soc. for Terrain-Vehicle Systems, Stockholm, Sweden.

72-2 SNOW STRATIGRAPHY AND DISTRIBUTION IN THE PETERBOROUGH, ONT. AREA. -- W. P. Adams, Trent University, Petersborough, Ont.

Study of the development of snow stratigraphy at sites in a 500 acre, wooded area. This work is undertaken in conjunction with regular snow course measurement of depth and water equivalent and periodic, more extensive, surveys of the same parameters over the entire area. The objectives include study of the relationships between the variations of snowcover and variations in vegetation.

72-3 PHYSICAL PROPERTIES OF THE SNOW COVER IN EURASIA. -- Michael Bilello, Roy Bates & Earl Boone. USA CRREL, Hanover, N.H. 03755

Work continues on an analog study on the snow-cover density for northern Eurasia based on a mathematical relationship between climate and surface snow conditions developed earlier for North America.

72-4 THEORETICAL AND EXPERIMENTAL STUDIES OF WATER FLOW THROUGH SNOW. -- S. C. Colbeck, USA CRREL, Hanover, N.H. 03755

The physical concepts of flow through porous media have been applied to the phenomena of water flow through snow. The theory developed has been tested through field experiments and it has been shown that accurate, quantitative predictions of water percolation can be made when the physical parameters of the snow and the surface fluxes are known. The theory is being extended to include capillary forces, capillary-end effects in snow lysimeters and the effects of inhomogeneous snow structures on the flow processes. Further work on characterizing snow structures and measuring capillary forces, water permeability, porosity and saturation in water-bearing snow is planned.

Colbeck, S. C. One-dimensional water flow through snow. USA CRREL Research Report 296.

Colbeck, S. C. A theory of water percolation in snow. Submitted to Journal of Glaciology.

Colbeck, S. C. & G. Davidson. Water percolation through homogeneous snow. Submitted to the IHD Symposia on the Role of Snow and Ice in Hydrology, Banff, Canada.

- 72-5 CHANGE IN THE QUALITY AND QUANTITY OF RADIATION TRANSMITTED BY SNOW. -- A. R. Eschner, SUNY College of Forestry, Syracuse, N.Y. 13210.

(1) Determination of the proportion of radiation incident upon the surface which is transmitted through snow of varying depths and stages of metamorphism. (2) Determination of the changes in the incident all wave spectrum in the transmission. Planning data was collected in the winter 1970-71.

- 72-6 DEFORMATION AND FAILURE OF ICE. -- L. W. Gold, Division of Building Research, National Research Council of Canada, Ottawa, Ont. K1A 0R6

To establish the dependence of the deformation and failure of ice on stress, temperature and time.

Gold, L. W. and A. S. Krausz. 1971. Investigation of the Mechanical Properties of St. Lawrence River Ice. NRCC 11820.

- 72-7 A. W. Hogan, ASRC-SUNYA, Scotia, N.Y.

General and continuing studies in nucleation, replication, physics and chemistry of snow and meltwater, snowpack and runoff.

Hogan, A. W. 1971. Snowmelt delay by oversnow travel. Water Resources Research. (In Press.)

- 72-8 GREAT LAKES SNOWSTORMS. -- James E. Jiusto, SUNYA, ASRC, Albany, N.Y.

(1) Development of a microphysics model of cloud behavior. (2) Analysis of synoptic influence on storm development and related modelling. (3) Field observations of natural storm properties. (4) Ground verification of NOAA seeding effects.

Holroyd, E. W. and J. E. Jiusto. 1971. Snowfall from a Heavily Seeded Cloud. *J. Appl. Meteor.*, 10, 266-269.

Jiusto, J. E. 1971. Crystal Development and Glaciation of a Supercooled Cloud. *J. Recherches Atmos.*, 5, 69-85.

Paine, D. A. 1971. The Diagnosis and Prediction of Synoptic-scale Influences Leading to Mesoscale Lake Effect Development. Ph.D. Thesis, SUNY Albany, (Univ. Microfilms).

Holroyd, E. W. 1971. The Meso- and Microscale Structure of Great Lakes Snowstorm Bands. Ph.D. Thesis, SUNY Albany, (Univ. Microfilms).

Jiusto, J. E. and G. Bosworth. 1971. Fall Velocity of Snowflakes. J. Appl. Meteor.

2. PRECIPITATION AND ACCUMULATION

- 72-9 THE LINKING OF MULTISCALED ENERGY SOURCES CREATING A SEVERE LOCAL WINTER STORM. -- D. A. Paine, Cornell University, Dept. of Meteorology, Rm 1109 Bradford, Ithaca, N.Y. 14850.

Gravity wave phenomena have been found to be a primary link between cumulus-scale energy sources and those features characterized by synoptic-scale wavelengths. Prediction of long gravitational waves appears promising as an objective technique for forecasting snow squall intensity and duration to the lee of the Great Lakes.

Paine, D. A. 1971. The Linking of Multiscaled Energy Sources Creating A Severe Local Winter Storm. In 7th Conference on Severe Local Storms (AMS) Kansas City. pp. 299-306.

- 72-10 GROUND TRUE PRECIPITATION STUDIES. -- Eugene Peck and Lee W. Larson, Office of Hydrology, Hydrologic R & D Laboratory, NOAA - National Weather Service, 8060 - 13th Street, Silver Spring, Maryland.

The general objective is to improve precipitation measurements (especially solid precipitation) by dual gage, profile, and site protection techniques. All these methods, to some extent, seem to reduce the disastrous effect of wind on the gage catch of solid precipitation.

Rechard, P. A. and Lee W. Larson. 1971. Snow Fence Shielding of Precipitation Gages. Journal-Hyd. Div., ASCE, pg. 1427.

Larson, Lee W. 1971. Precipitation and its Measurement - A State of the Art. Water Resource Series #24, Univ. of Wyoming, Laramie, Wyo.

Larson, Lee W. 1971. Shielding Precipitation Gages From Adverse Wind Effects. Water Resource Series #25, Univ. of Wyoming, Laramie, Wyo.

- 72-11 ON-SITE MODEL STUDY OF SNOW DRIFTING AT DEW LINE ICE CAP STATION, DYE-2, GREENLAND. Wayne Tobiasson, Construction Engineering Research Branch, USA CRREL, Hanover, N.H. 03755.

The objective of this study is to develop a better understanding of the configuration and growth rate of snow drifting around a large elevated structure located on the Greenland ice cap.

A 1:10 scale model has been built one mile from the structure and snow accumulation data have been collected by station personnel for more than a year.

Drifting patterns and rates of accumulation have been analyzed.

- 72-12 MODIFICATION OF GREAT LAKES WINTER STORMS. -- H. Weickmann, NOAA-DOC PSRB #3, Boulder, Colorado 80302.

It is attempted to redistribute the severe snowfalls which occur locally due to the airflow across the warm lakes. Seeding converts natural snow crystals which are clumped and which fall rapidly into small individual crystals which fall slowly and are therefore carried further inland, away from the densely populated lakeshore areas. The project requires a complete study of the precipitation mechanism of these shallow cloud systems.

3. SNOWPACK MEASUREMENT

- 72-13 STUDY OF THE APPLICATION OF SATELLITE HIGH RESOLUTION INFRARED DATA FOR MAPPING SNOW COVER. -- James C. Barnes, Allied Research Associates, Inc. Virginia Road, Concord, Massachusetts 01742.

Objectives: (1) to determine whether existing radiometers onboard the Nimbus and ITOS satellites can provide hydrologically useful snow information, and (2) to develop analysis techniques applicable to future IR sensor systems on earth satellites. Data over the United States and Canada during periods of snow cover and snow cover change will be acquired from the Nimbus 3, Nimbus 4, ITOS 1, and NOAA 1 satellites. The IR measurements, in film-strip and digitized formats, will be analyzed in conjunction with concurrent satellite photographs and conventional snow cover data. Study will be completed in May 1972.

Financed by National Oceanic and Atmospheric Administration. A Final Report will be published at end of study period.

- 72-14 THE EFFECT OF FORESTS ON SNOW ACCUMULATION AND MELT IN VARIOUS ELEVATION ZONES OF THE HESSIAN LOW MOUNTAINS. -- H. M. Brechtel and A. R. Eschner Hess. Forst. Versuchsanstalt, D-351 Hann. Münden, W. Germany and SUNY College of Forestry, Syracuse, N.Y. 13210, respectively.

To quantify the effect on snow accumulation and dissipation of aspect, elevation and vegetation in the low mountains of Hessen. 600+ snow survey lines have been established on north and south facing slopes, at 100 m. elevation intervals, under beech and spruce and on open land. Measurements have started winter 1971-72.

Brechtel, H. M. 1971. Erkundung der Auswirkung des Waldes auf die Schneeansammlung und Schneeschmelze in den verschiedenen Höhenstufen der hessischen Mittelgebirge. Proceedings Symposium "Interpraevent 1971". Villach (Austria).

- 72-15 AUTOMATIC MEASUREMENT OF WATER EQUIVALENT AND DENSITY PROFILES OF THE SNOWPACK. -- Pierre R. Gosselin, M.Sc., Department of Natural Resources, 1640 Boul. de l'Entente, Quebec 6, P.Q.

The main project consists in developing an automatic measuring system that gives the total water equivalent and density profile of the snowpack. This system provides data on a daily basis. Further works should lead to the establishment of a network of such systems north of the 50th parallel in Quebec (Canada) that should report daily by radio. This instrument will be incorporated in a more complex automatic weather station that will report complete climatological data.

Gosselin, Pierre. 1969. Télénivomètre horizontal de l'E.D.F. (Le). Feuillelet Météorologique, pp. 414-428.

Gosselin, Pierre. 1971. Appareil de mesure automatique de la neige (Un). L'Ingénieur, No. 270, 57ième année.

- 72-16 EVALUATION OF CANADIAN SNOW RESOURCES. -- G. A. McKay and B. F. Findlay, Atmospheric Environment Service, 4905 Dufferin Street, Downsview, Ont.

A broad scale investigation of snow depth and density throughout Canada, relating vegetative, topographic and climatic factors to explain variation. A general overview has been completed and plans are to convert the snow record archive to punched cards whereupon more fine scale definition may be accomplished.

McKay, G. A. and B. F. Findlay. 1971. Variation of Snow Resources with Climate and Vegetation in Canada. Billings, Montana, 21 pp.

Findlay, B. F. and G. A. McKay. 1972. Climatological Estimation of Canadian Snow Resources. Proc. 22nd International Geographical Congress, Montreal, (In Press).

- 72-17 NEWFOUNDLAND AND LABRADOR POWER COMMISSION ANNUAL SPRING SNOW SURVEY AND SPRING FLOOD FORECAST 1971. Wyn. R. Haynes, Newfoundland & Labrador Power Commission, Philip Place, St. John's, Newfoundland, Canada.

Two snow surveys are to be made each year in March and April to help forecast the spring floods for the Bay D'Espoir Hydro Electric Scheme. Records to be made of snow depth, water equivalent and elevations of sites.

Only one set of measurements was taken in 1971 at 66 permanent location points set up in the 2278 sq. mile watershed in Central Newfoundland. This was the first year of readings.

72-18 CONTINUING PROGRAM OF SNOW-COVER INVESTIGATIONS IN IHD REPRESENTATIVE DRAINAGE BASINS. -- L. A. Logan, River Basin Research Branch, Ontario Water Resources Commission, Division of Water Resources, 135 St. Clair Avenue West, Toronto 195, Ont.

To determine reliable estimates of basin-wide snowpack conditions (measured indices - depth, water equivalent, core length, density and temperature) for use in evaluating the snowpack storage and yield potential, time delays to runoff and for snowmelt hydrograph synthesis.

Continuing statistical evaluation of data from two sampling networks, relative to sampling accuracy, areal distribution of snowpack parameters and the influence of elevation on snowpack depth-density relationship.

Logan L. A. 1971. Snow Survey Report - East and Middle Oakville Creek Basin: 1968-1969. OWRC Water Resources Bulletin 4-1.

(In preparation) - Logan, L. A. Snow Survey Report - Wilmot Creek Sub-basin: 1968-1971.

Snow Survey Report - East and Middle Oakville Creek Basin: 1969-1971.

72-19 MONITORING OF SNOW-WATER EQUIVALENT BY AERIAL RADIOLOGICAL SYSTEMS. -- Eugene L. Peck, NOAA - National Weather Service - W232, 8060 - 13th St., Silver Spring, Md. 20910.

Remote (aircraft) measurement of the areal water equivalent of snow is the objective. The basis of the method is monitoring attenuation by the snow cover of naturally occurring gamma radiation emitted from the soil. A standard error of estimate of 0.6 - 0.8 cm water is typical for relatively shallow snow covers (less than 10 cm). The measurement accuracy decreases with increasing water equivalent.

Peck, E. L., V. C. Bissell, E. B. Jones, and D. L. Burge. 1971. Evaluation of Snow Water Equivalent by Airborne Measurement of Passive Terrestrial Gamma Radiation. Water Resources Research, Vol. 7, No. 5.

Peck, E. L. and V. C. Bissell. 1971. Aerial Measurement of Snow Water Equivalent by Terrestrial Gamma Radiation Survey. Paper presented at the Fifteenth General Assembly, IUGG, Moscow, USSR.

Fritzsche, A. E. and Z. G. Burson. 1970. Water Equivalent of Snow Surveys Using Natural Terrain Radiation. EGG 1183-1495.

Burge, D. L., Z. G. Burson, and A. E. Fritzsche. 1971. Water Equivalent of Snow Measurements Using Natural Terrain Radiation. EGG 1183-1533.

- 72-20 HYDROLOGIC BEHAVIOR OF A SUBARCTIC WATERSHED - CARIBOU-POKER CREEKS RESEARCH WATERSHED. -- C. W. Slaughter, USA CRREL, Hanover, N.H. 03755.

To develop a comprehensive understanding of environmental relationships, processes, and parameters, with initial emphasis on hydrologic relationships, of an upland watershed in the discontinuous permafrost zone of interior Alaska.

Direct observations on seasonal snowpack include three standard SCS snow courses, one continuous-recording snow pillow, and five 40-point, 1000-m-long, "transects" for monitoring snowpack distribution. Research is also underway on seasonal stream "icings" in the same watershed.

"Caribou-Poker Creeks Research Watershed: Background and Current Status" USA CRREL Special Report 157.

- 72-21 YUKON RIVER AND FORT GREELY, ALASKA SNOW OBSERVATION NETWORKS. -- Soil Conservation Service, with: USA CRREL, Michael Bilello, Coordinator, Hanover, N.H. 03755.

Monthly measurements of snow depth, water equivalent of snow, and snow density are taken at numerous stations in central Alaska. Annual reports on the results of these observations have been provided since 1965.

USA CRREL unpublished reports:

1. "Fort Greely Military Reservation Snow Surveys." Annual series starting in 1968.
2. "Yukon River Basin Snow Surveys." Annual series starting in 1965.

4. SNOWMELT

- 72-22 COOPERATIVE SNOW HYDROLOGY PROJECT - NOAA NATIONAL WEATHER SERVICE AND ARS NEW ENGLAND WATERSHED RESEARCH CENTER. -- Eric Anderson and Ron Whipkey, Office of Hydrology, W232, National Weather Service, Silver Spring, Md. 20910, and New England Watershed Research Center, Kennedy Plaza, Kennedy Drive, S. Burlington, Vermont 05401, respectively.

To better understand the physical processes involved in the metamorphosis and melting of a snowpack. Project began 1966. Data collection continues. Analysis is underway on the three years of continuous data so far collected (1969-1971).

- 72-23 SOIL MOISTURE AND SNOW HYDROLOGY OF BLACK RIVER BASIN. -- William N. Embree and Edward C. Rhodehamel, U.S. Geological Survey, P. O. Box 948, Albany, N.Y. 12201.

(1) To provide knowledge of the association between springtime snowmelting and the groundwater storage. (2) Work began in December 1970. To date nineteen access tubes have been installed in the Black River basin so that evaluation of soil moisture conditions can be accomplished by logging the moisture profile with a neutron-scatter probe that provides a direct read-out of soil moisture in percent by volume of the sediments. (3) Snow courses have been established at each soil moisture measurement site to aid in evaluating the snow melt contribution to soil moisture. (4) Hydrologic data, including precipitation, streamflow, and groundwater levels are used to provide a basis for obtaining basin-wide values of gains and losses in soil moisture.

- 72-24 APPLICATION OF ENVIRONMENTAL ANALYSIS TO WATERSHED SNOWMELT. -- Robert L. Hendrick, New England Watershed Research Center, USDA - ARS, Kennedy Drive, S. Burlington, Vermont 05401.

Testing of environment-snowmelt model is completed. A regional Water-input (rainfall and snowmelt) climatological model is under development.

"Application of Environmental Analysis to Watershed Snowmelt." J. of Applied Meteorology, Vol. 10, No. 3, 418-429. June 1971.

5. STREAMFLOW

- 72-25 PREDICTING SNOWMELT STREAMFLOW FROM AN ADIRONDACK WATERSHED. -- James R. Colquhoun, SUNY College of Forestry, Syracuse, N.Y. 13210.

Equations were developed which explained approximately 90% of the variation in mean daily streamflow during the snowmelt period from March 1 until the time of complete snow disappearance. Independence River above Donnattsburg, N.Y.

Colquhoun, J. R. 1971. Predicting snowmelt streamflow from an Adirondack watershed. Unpublished M.S. Thesis. SUNY College of Forestry. 98 pp.

- 72-26 CONTINUING STUDY OF WINTER STREAMFLOW MEASUREMENT CONDITIONS, PROBLEMS AND TECHNIQUES AT GAUGING STATIONS ON SMALL STREAMS. -- B. Jaffray, River Basin Research Branch, Ontario Water Resources Commission, 135 St. Clair Avenue West, Toronto 195, Ont.

To investigate and document winter conditions and problems associated with these for the purpose of obtaining accurate stage-discharge relationships at gauging stations on small streams.

- Preliminary evaluations resulted with a prepared "Guidelines for Winter Streamflow Operation".
- Continuing observations on the de-icing effects of heating cables in artificial controls.

(In preparation)

Jaffray, B. - Ice Effects on Small Streams - Office and Field Procedures.
- A preliminary report.

- 72-27 THE EFFECT OF FOREST CLEARING ON SNOWMELT RUNOFF IN NEW ENGLAND. --
Robert S. Pierce, USDA Forest Service, Northeastern Forest Experiment
Station, Box 640, Durham, N.H. 03824

Small gaged watersheds are being used to study the effects of forest practices on snowmelt runoff. The influence of strip-cutting a hardwood forest on snow accumulation and melt is being studied. Differences between melt rates in the forest and in the open are being measured with small snowmelt lysimeters.

Federer, C. A. 1971. Solar radiation absorption by leafless hardwood forests. *Agricultural Meteorol.* 8 (Nov. issue).

Federer, C. A. and R. E. Leonard. 1971. Snowmelt in hardwood forests. *Proc. 1971 Eastern Snow Conf.*, p. 95-109.

6. LAKE AND RIVER ICE

- 72-28 DETERMINATION OF ICE FORCES AGAINST SMALL STRUCTURES. -- H. G. Acres, Ltd.
5259 Dorchester Road, Niagara Falls, Ontario, Canada.

To develop instrumentation to measure static and dynamic ice forces against hydraulic structures, and telemetry to transmit data semi-automatically to a central control station.

Atkinson, C. H., D.L.R. Cronin, J. V. Danys. 1971. "Measurement of Ice Forces Against a Lightpier" Proceedings, Conference on Port and Ocean Engineering under Arctic Conditions, Trondheim, Norway.

- 72-29 STUDY OF THE APPLICATION OF SCANNING RADIOMETER (SR) INFRARED MEASUREMENTS FROM THE ITOS SATELLITE FOR MAPPING SEA ICE. -- James C. Barnes, Allied Research Associates, Inc., Virginia Road, Concord, Massachusetts 01742.

To study the application of ITOS-SR Infrared measurements for mapping sea ice. The study objectives are: (1) To determine whether ice distributions can be mapped from nighttime ITOS-SR data using the techniques and thresholds developed previously for Nimbus HRIR data; (2) to compare nighttime and daytime infrared measurements in the 10.5 to 12.5 μm spectral interval using ITOS and, if necessary, Nimbus 4 data; and (3) to perform quantitative analyses of the ITOS-SR photofacsimile data. Study will be completed in June 1972.

This study is under contract with the National Oceanic and Atmospheric Administration. A Final Report will be published at the end of the contract period.

- 72-30 STUDY OF RIVER AND LAKE ICE I. H. D. Project No. C.6.7. -- J. B. Bryce, Ontario Hydro, 620 University Avenue, Toronto 2, Ontario, Canada.

A ten-year program to study the formation, movement, and dissipation of ice in the Niagara River between Fort Erie and Grass Island Pool at the Control Structure immediately upstream of the Falls.

During the 1970-71 ice season, no field investigations of any significance were undertaken. The progress of Meteorological and water temperature data acquisition was continued. Emphasis was placed on data analysis, both observational and numerical, and preparation of reports, which continues.

- 72-31 ICE PRESSURES. -- R. Frederking, Division of Building Research, National Research Council of Canada, Ottawa, Ontario K1A 0R6.

To establish the criteria required for the design of structures subject to forces due to ice.

Frederking, R. and L. W. Gold. 1971. "Ice Forces on an Isolated Circular Pile", presented at International Conference on Port and Ocean Engineering under Arctic Conditions.

- 72-32 ICE FORMATION AND BREAK-UP. -- G. P. Williams, Division of Building Research, National Research Council of Canada, Ottawa, Ontario K1A 0R6.

To develop an improved method for predicting the date of break-up of lakes for purposes of transpiration and construction.

Williams, G. P. 1971. "Predicting the Date of Lake Ice Breakup", NRCC 11865.

Williams, G. P. 1971. "The Effect of Lake and River Ice on Snowmelt Runoff", Proceedings Hydrology Symposium, Quebec City, NRC Associate Committee on Geodesy and Geophysics, May, 1971.

7. HIGHWAYS AND BUILDINGS

- 72-33 SURFACE EFFECTS VEHICLE STUDY - VEHICLE INTERFACE PROGRAM. -- Gunars Abele, USA CRREL, Hanover, N.H. 03755.

Investigate interaction of air cushion vehicles on terrain including snow cover.

Considerable amount of testing on snow covered terrain has been accomplished.

Snow Surface Erosion from a Peripheral Jet Cushion ACV. USA CRREL Special Report 163.

72-34 IMPROVED HIGHWAY DESIGN AND OPERATIONS FOR SAFETY MINIMIZING THE CONSEQUENCES OF SNOW AND ICE. -- George P. Bennett, U. S. Federal Highway Administration, Washington, D. C. 20591.

The research in this program is directed to resolving the problems of forecasting, predicting, and detecting frost, rain, sleet, snow, and ice on roadway surfaces; improving the performance capabilities of winter maintenance operations; developing snow and ice prevention and removal systems applicable to critical areas; and providing the criteria needed by administrators to justify construction and operation of snow and ice prediction, detection, prevention, removal and control systems by user agencies.

Four Tasks: IM1 - To evaluate the snow and ice detection systems currently available and to select from them a system or combination of components which meets the requirements of sensitivity, reliability, accuracy, durability, and cost to using agencies.

IM2 - a. A detailed study of sample data currently available from existing sources and jurisdictions as outputs from the snow and ice detection systems they presently use. b. Prepare a document for maintenance organizations dealing with ways in which snow and ice prediction and detection systems can be used to assist in upgrading and improving the effectiveness of winter maintenance programs.

IM3 - a. A feasibility study for using nuclear waste materials as a heat source for deicing highway bridges, ramps and pavements. b. A laboratory test to compare pavement heating systems using electrical energy with those using the earth as a heat source. c. Design a deicing system to be incorporated into an actual interchange to be constructed at a site chosen by the State.

IM4 - To develop a method that can be used by a highway administrator to determine the added design or extra maintenance costs which can be justified to prevent or counteract and minimize the effects of frost, ice and snow on bridge decks, ramps, and pavements.

72-35 NATIONAL SURVEY OF ICING LOADS ON STRUCTURES. -- D. W. Boyd, Division of Building Research, National Research Council of Canada, Ottawa, Ontario K1A 0R6.

To obtain through reports of icing occurrences and structural failures, information required for establishing design icing loads on a regional basis for electrical and communication lines, and for towers and similar structures.

72-36 SURVEY OF SNOW LOADS ON ROOFS. -- D. A. Lutes, Division of Building Research, National Research Council of Canada, Ottawa, Ontario K1A 0R6.

Survey of actual snow loads on roofs to provide base for design snow loads for National Building Code.

72-37 SNOW AND ICE CONTROL. -- L. David Minsk, USA CRREL, Hanover, N.H. 03755.

Develop techniques for prevention and control of snow and ice accumulation on various structures including pavements, buildings, etc.

A model snow drifting facility is in process of preliminary design which may utilize a water flume principle.

Spectral Reflectance of Ice. Unpublished Technical Note, USA CRREL.

72-38 SNOW AND AVALANCHES. -- P. A. Schaerer, Division of Building Research, National Research Council of Canada, Ottawa, Ontario K1A 0R6

To obtain the information required for making decisions concerning avalanche control projects, and for the design of avalanche defense structures and buildings in deep snow areas.

72-39 SNOW LOADS ON BUILDINGS. -- Wayne)Tobiasson, Const. Engng. Res. Br., USA CRREL, Hanover, N.H. 03755.

The objective of this study is to update present snow load design criteria used by the U.S. Army. Both the geographic variation of snow load on the ground and the thermal, geometric and aerodynamic properties of structures are being considered. Emphasis is being directed at developing case histories, examining building failures under snow load and defining ground loads for the state of Alaska.

72-40 SNOW MELTING SYSTEMS. -- G. P. Williams, Division of Building Research, National Research Council of Canada, Ottawa, Ontario K1A 0R6.

To establish design criteria for embedded and above ground snow and ice melting systems.

8. SOIL WATER AND FROST

72-41 THERMAL CONDUCTIVITY OF FROZEN AND UNFROZEN PEAT. -- A. L. Burwash, Muskeg Research Institute, 814 Montgomery Street, Fredericton, N. B.

To determine the relationship between thermal conductivity and peat properties, namely peat structure and water-ice content. To date, 3 of the 17 peat categories have been tested.

Thermal Regime and Peat Constitution, In: Proceedings 14th Muskeg Research Conference, 1971 (In Press).