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NOTES ON PROPOSED D.E.D. HEATING TRIALS AT RESOLUTE BAY

A. D. Kent

March 31, 1952.

NOTES ON PROPOSED D.E.D. HEATING TRIALS

AT RESOLUTE BAY

On March 27th, a meeting was held at the Montreal Road Laboratories of N.R.C. to discuss details of proposed heating trials to be carried out at Resolute Bay by the Directorate of Engineer Development. Those present were Major A. Taylor, D.E.D., Mr. G. L. Ballantyne, Crane Corporation, Corporal N. J. Findlay, R.C.E.M.E., Messrs. A. G. Wilson and A. D. Kent, N.R.C.

The proposal as outlined by Major Taylor involved the testing of a Jet-Heet warm-air heating system, supplied and installed by Mr. Ballantyne, which unit would undergo user trials in a hut at Resolute Bay this coming April. Arrangements had been made for Mr. Ballantyne to fly in on the 3rd of April with two complete units, one to act as a standby. The trials would continue for approximately two or three months. The building in which the system is to be installed is thought to be a 24 ft. by 32 ft. hut, now being used as a transient hotel at Resolute Bay, the building having no partitions. There is some question, however, as to whether or not two similar Air Force buildings may be available so that a comparison may be made between the Jet-Heet unit and a Coleman Space Heater of the type in general use there at present.

In discussing a comparison trial of the two types of heater, it was pointed out that it would be very difficult to achieve a good comparison between two units in two separate buildings without some control over such factors as ventilation rate, number of occupants, etc. It was generally agreed that the best that could be hoped for would be some idea of the performance of the Jet-Heet unit with regard to fuel consumption and temperature distribution in what ever building it was installed. Similar readings for the Coleman unit, while not necessarily comparable because of differences in the two buildings, would be of interest.

The following were discussed in detail:

Weather Records: Records of wind direction and velocity, outside air temperature and sunshine hours could be obtained from the local meterological station.

Fuel Consumption: It was proposed to use ten gallon drums previously calibrated and supplied with dip-sticks for measurement of fuel consumption. Drums would be filled daily from supply tanks preferably by a valve arrangement and readings taken before and after filling each drum.

Temperature Distribution: To obtain temperature distribution of air within buildings, it was proposed to use thirty-six Laboratory Type thermometers, supplied by D.E.D.,

twenty-seven of which would be arranged in groups of three at nine separate locations within the Jet-Heet building and the remaining nine in the Coleman space heated building. At each location there would be thermometers at 2 inches and 60 inches from the floor, and 2 inches below the level of the upper plate of the walls (see appendix A.) It was proposed to take readings of these thermometers daily at 8:00 A.M., 12:00 noon, 5:00 P.M. and 10:00 P.M. The hygro-thermograph which would be made available by N.R.C. would be located adjacent to the thermostat of the heating unit at 30 inch level on a post within the room. In addition an integrating time recorder for the oil burner would be supplied by Mr. Ballantyne.

It was proposed that N.R.C. staff make out a sample chart or data sheet for the convenience of Corporal Findlay who would be in charge of recording the performance data of the test. Mr. Ballantyne also requested that a "U" value for the building components be calculated and he was assured that this would be done as soon as details of the building construction were known. Major Taylor offered to supply N.R.C. with the details of construction as soon as it was determined in what building the tests would be carried out.

Following the meeting, a sample data sheet was made by N.R.C. staff (See Appendix B.) providing space for temperature, fuel consumption and weather records, as well as space for the number of occupants of the building. It is proposed that data sheets similar to this, with any modifications felt necessary by Corporal Findlay or Mr. Ballantyne be kept in a log book, provided by N.R.C. for the purpose. The right-hand pages of the book could be used for data sheets and the left-hand pages for a running log of incidents which would affect the test and the time they occurred, such as doors or windows left open, and for any entries on the performance of the building, comfort reactions of the occupants, etc. It is to be emphasized that records should be as complete as possible for a true assessment of the test data. It is suggested that the first few pages of the book might be used to record the following.

(a) a plot plan of the building showing its location in the camp, orientation (north arrow), adjacent buildings, etc.

(b) a plan of the building interior showing positions of doors, windows, furniture, heater, etc. and thermometer locations.

(c) Elevations of one or more walls showing window size and position, and door size and position.

(d) A Key to the thermometer numbers used in the data sheet, giving location of each thermometer.

(e) Notes in connection with the installation of the Jet-Heet system.

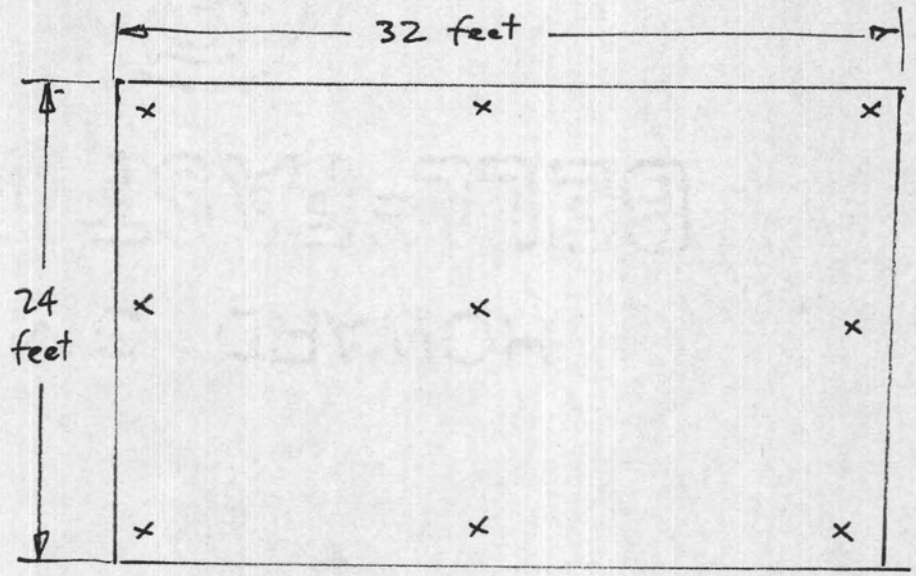
It is suggested that the 24-hour period considered as each "day" for purposes of average outside air temperature and fuel consumption be the period 800hrs. to 800hrs. the following

day. Temperature readings might be arranged as shown in the sample data sheet so that about half the readings be taken before fuel readings and about half following the fuel readings. Fuel readings, to be accurate, must be taken at fixed times.

It would be advisable to check the relative humidity of the hygro-thermograph against a sling psychrometer which in all probability would be available from the weather station.

Appendix A.

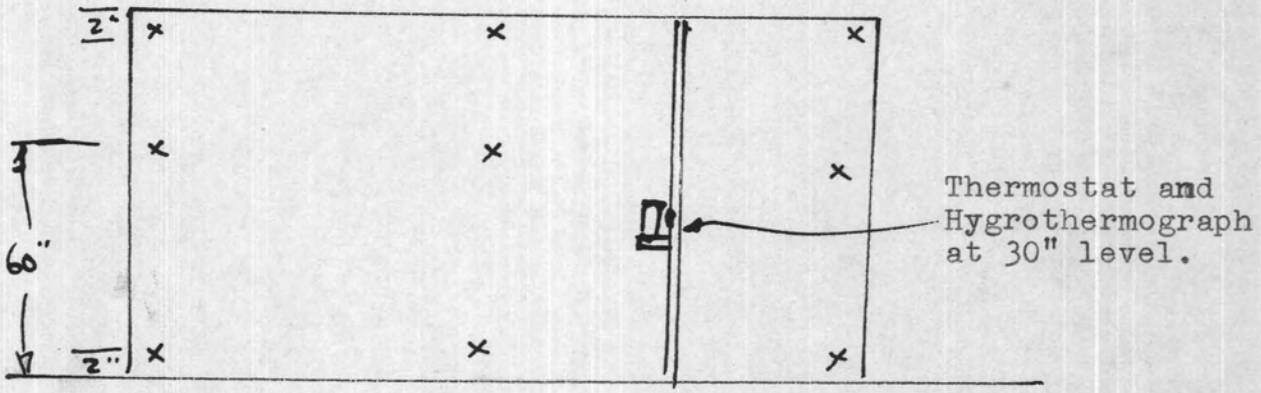
Proposed arrangement of thermometers.



PLAN OF BUILDING

Showing thermometer locations (x)

Thermometers to be located approx. 1 foot from walls and
at 2 inches above floor
60 inches above floor
2 inches below level of upper plate of walls.



ELEVATION

Appendix B

Date. . . . . .
Recorded by . . . . . .

	Building . . . . . Heater				Building . . . . . Heater			
Time								
1 2 3								
4 5 6								
7 8 9								
10 11 12								
13 14 15								
16 17 18								
THERMOMETER NO. 19 20 21								
22 23 24								
25 26 27								
Time								
Occupants								
Fuel Read. Before								
After								
Consumption								
				Total				Total

Weather Record

Ave. out. air temp. . . . . .
Wind direction . . . . . .
Ave. Wind Velocity . . . . . .
Sunshine hours . . . . . .

General Weather Observations