Lighting laboratory promotes energy conservation

The National Research Council's lighting laboratory in Ottawa is conducting research on energy with a view to influencing the attitudes of Canadians towards conservation.

Commercial buildings, including offices, schools and stores, are the major users of lights, consuming over 60 per cent of the total usage. In some cases, depending upon building type, this can account for 40 to 50 per cent of the energy consumption.

The objective of the laboratory is to furnish the building industry with information on good lighting design and practice and to provide the hardware to achieve energy conservation in offices and schools. With the assistance of a lighting consultant, a manual of practice for lighting energy consumption is being prepared together with a casebook of energy conscious lighting installations. "But," points out Alan Levy, who set up the laboratory, "to be effective in lighting energy conservation, it is not sufficient for us to just do research here and publish papers. We must interact with the world outside in a very direct way."

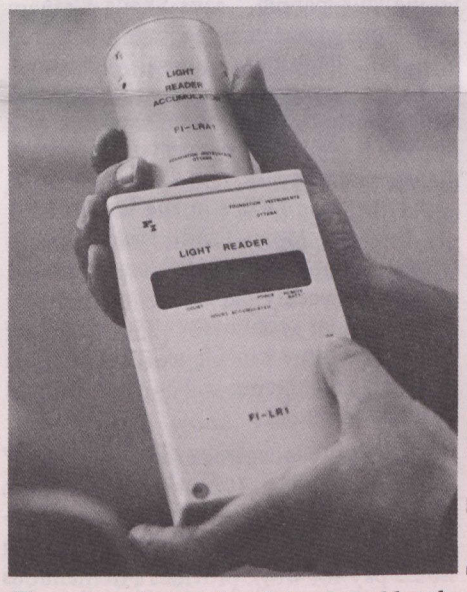
Meter monitors lights

A meter, which records the number of hours lights are on in a room, has been designed and developed by the laboratory staff. An Ottawa company is making the device and a licence to manufacture it is currently being sought. The meter is inexpensive, battery-operated, and can be easily affixed to a wall. It has an additional advantage: it monitors hours of use separately from power loads. Thus, the lowering of lighting levels as the sole measure of conservation can be avoided (studies have shown that reduction in light level affects productivity and can cause absenteeism; correct light levels for many tasks have yet to be established) and less controversial methods, for instance, automatic control and efficient switching can be applied immediately.

If the meter is read with sufficient frequency over a period of time, a daily power load pattern for lighting will emerge. Building owners and operators can then evaluate the dollar savings possible by regulating load demand in relation to peak electricity rates. Such data will be useful to electricity generating and distributing companies for setting present and future generating capacity plans and energy conservation policies.

The meter may be developed further from a passive recording device to an active control device, switching lights in relation to occupancy and daylight levels.

The NRC group is collecting information on patterns of use with time-lapse photography. A movie camera mounted in the ceiling records every six minutes how many lights are on and if the space is occupied. Used in conjunction with a watch, the amount of energy used over a 24-hour period and the occupancy rate an hour can be calculated.

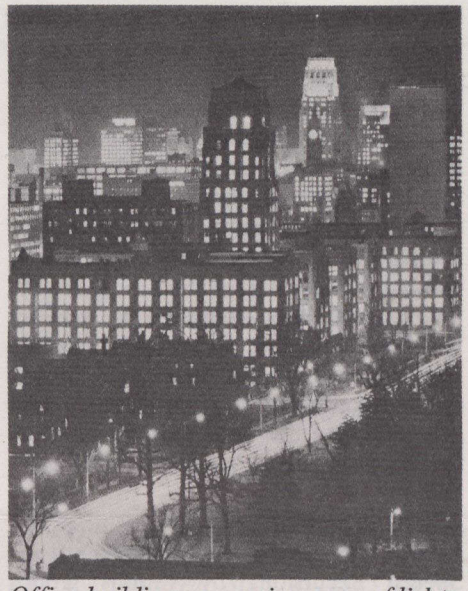


Bruce Kane, NRC

The meter designed and developed by the laboratory to record the number of hours lights are on in a room.

Timer switch

At the present time, an all electronic timer switch is also being developed which has good market possibilities. When a button is pushed, 15, 30, 45 or 60 minutes of light is emitted. Five minutes or so before the lights are to go off, they dim momentarily, presenting a visual warning. The timer switch is also a crude occupancy detector because if a person leaves the room, the lights go off in his absence. Similarily, as a crude daylight control, when interior daylight levels are sufficient and the artificial lights are timed out, the user must decide whether additional light is really required. More sophisticated controls which dim and switch off artificial light automatically depending upon the intensity of interior daylight levels are also under investigation.



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Office buildings are major users of lights.

Another device, which is being re-introduced, is the pull-cord switch. In an open-office concept, for example, individual switching above a desk is more flexible because desks and people can be moved from place to place; the pull-cord switch is easy to install and cheap, but is not very attractive. A multi-national company is working with the group to redesign it, and a Winnipeg company is developing more attractive pull-cord.

A novel method of rewiring buildings for extra light switching capacity is being developed using fibre-optic technology. The control wires and switch can be surface-mounted since they are completely electrically isolated from the switching load.

In co-operation with the Canadian Illuminating Engineering Research Institute, the laboratory will be carrying out human visual performance studies with a particular type of light. In addition, the group and a consultant will study the lighting design process in Canada from concept to product.

In addition to the lighting laboratory, the Council has established an office of lighting research, which will co-ordinate NRC's efforts in the field by promoting better communication and exchange of information. It will also serve as an interface between the Council's lighting research groups and outside organizations such as other government departments, industry, universities, and national and international standardizing bodies concerned with lighting.

(Article by Joan Powers Rickerd in Science Dimension *1979/4.)*