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A Study of Thermal Stress Based on Metabolic and Radiation Heat for Improvement of Working Environment in Exposed Spaces (Part 1 Aspects of summer heat and storage of body heat)

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Summary: As a recent tendency to take high interest in the environmental problem, the time has come to reconsider the present working conditions. The thermal environment at an exposed working place in a hot season with skylight should keep within the thermal limitation of human body, considering the metabolic heat and radiation heat. Otherwise, the storage of body heat accumulating during an operation has an effect on deteriorating the work efficiency and the deficit of attention. In case of severe conditions beyond the criterion of thermal environment, some countermeasures such as the use of sunshade or cooling fan need to be taken adequately. Then, the relation between the heat storage of body during work and the environmental factors has to be clarified reliably corresponding to the magnitude of working load.

In order to grasp this relation, the formula of heat storage of human body considering the effect of sunshine is established, and the experiment in the exercise using an ergo-meter is carried out with measuring the temperature of body skin under sunshine environment. Moreover, the working conditions on the upper deck of a building ship are measured to investigate the actual situation of working environment. And it attempts to examine the thermal criterion of working environment by merging these results.

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