

engineering sciences

HUMAN ENGINEERING

Keeping a cool head

An engineer at Kansas State University is working on water-cooled hoods to protect people who work under high-temperature conditions.

Dr. Stephen A. Konz has designed three hoods: the first made of canvas, the second of rubber and the latest one of a special nylon. The cooling effect comes from a pump circulating ice water through tubes in the hoods. Dr. Konz has found that to be really effective a hood must cover the head and neck and must be porous.

CORROSION

Electrode system for BART

An automatic system used to prevent salt-water corrosion to ship hulls and offshore platforms is being adapted for the San Francisco Bay Area Rapid Transit District's trans-bay tube. The tube, which links San Francisco to Oakland, is over four miles long and about 2.5 million square feet in area.

Developed by Lockheed Aircraft Corporation, the system uses electrodes to neutralize the corrosive effects of seawater electrically. Similar devices deteriorate, but these lead-platinum anodes are expected to last as long as the structure they protect.

WIND TUNNELS

Streamlining skiers

Engineers are working with Canadian skiers to give Canada an edge over other nations in the 1972 Winter Olympics at Sapporo, Japan.

The skiers are put in a wind tunnel operated by the National Research Council of Canada. The objective of "Operation Sapporo" is to find ways to reduce drag, or wind resistance, experienced by skiers competing in downhill races. Decreasing drag could increase a skier's speed.

The wind tunnel tests, which simulate drag conditions, have so far produced a new crouch position. Other tests indicate that changes in the design of ski equipment and clothing can cut drag. One of the most important results shows that a skier's hands, flailing out for even a second or two, can cut speed.

COMPUTERS

Tropical weather simulated

A scientist at the Environmental Science Services Administration of the U.S. Department of Commerce has successfully modeled and predicted tropical weather patterns.

Dr. Kikuro Miyakoda of the ESSA Geophysical Fluid Dynamics Laboratory in Princeton, N.J., developed a mathematical model of the atmosphere based on general laws governing its behavior. The model was fed to a computer and information on the many variables in the atmosphere, including air currents, radiation, clouds and moisture content, went in as well. The information

was for early March 1965 and was representative of all parts of the world.

The computer then predicted what the weather over the world's tropical areas would be for several days. A check confirmed the prediction.

MAGNETS

Largest superconducting magnet tested

The world's largest superconducting magnet has passed its first operational test with room to spare. The giant 110-ton mass of coils and its 1,600-ton steel yoke exceeded expectations in its initial trial at the Atomic Energy Commission's Argonne National Laboratory, near Chicago. The magnet operated at 1,900 amperes and generated a central field of 18.5 kilogauss; a powerful magnet generates one gauss. The energy stored in the magnetic field is 80 million joules, or the equivalent of 50 pounds of TNT.

The magnet is to be used for high energy physics research. It will operate with Argonne's 12.5 billion electron volt accelerator.

METALLURGY

Sandwich steel stronger

A high-strength Japanese steel, called In-U, with a tensile strength enough to resist 250 kilograms per square millimeter, will be used in high-speed engines, gas turbines and space equipment.

The new steel is made by sandwiching thin sheets of copper, nickel and other metals only 10 microns thick between the sheets of steel and then tempering the layers.

The research team of Ishikawajima-Harima Heavy Industries got the idea for the process from Japanese swordmakers, who forged strong blades by placing iron sheets of different composition on top of each other and tempering them.

THERMAL STORAGE

Off-peak heat for industry

Electric thermal storage systems that draw their power at cheap off-peak rates are being tried out for the first time by British industry. They offer economies to industry parallel with those already enjoyed by domestic users. Power is drawn at night, when demand is low.

A paint firm, Joseph Mason and Co. of Derby, is the first to try out the new scheme, and is well pleased with the results. A heater developed by researchers at the Electricity Council is used to supply hot air at a controlled rate to the jacket of a 500-gallon kettle within which synthetic resins are mixed.

The Electricity Council believes that running costs can be reduced still further if a heat transfer medium other than air can be developed. The system is readily adaptable to other processes, particularly in the chemicals, plastics and allied fields.

The unit is designed to charge in eight hours at night, when electricity is cheapest. The store, raised to a maximum temperature of 750 degrees C., will hold 640 kilowatt hours of useful energy.