

RADIATION SAFETY MEASURE

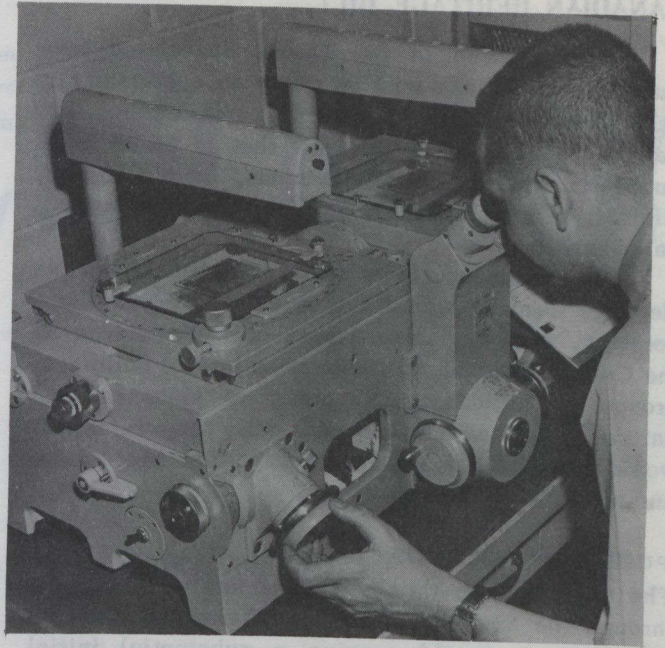
A new technique has been developed at the Chalk River Nuclear Laboratories of Atomic Energy of Canada Limited that drastically reduces the time workers must spend in radiation fields to carry out maintenance.

One of the concerns of nuclear-reactor operations is the so-called "man-rem problem". Maintenance staff are exposed to radiation during the course of their work and maintenance time must be minimized.

One of the first steps when major repairs or modifications are required round a reactor is to measure the area. This is particularly important when, as is often the case, systems modifications have been completed previously and existing drawings are not up to date.

Using a method recently developed, the measurements of the area can be carried out in another location by combining the abilities of cameras and computers. The conventional and time-consuming measuring normally performed in radiation fields is no longer required.

John Harris, who is employed in the Design and Technical Services Branch, Plan Design Division, AECL, has perfected the camera technique to obtain the measurements. The actual time spent in the



Two glass negatives are placed in the stereocomparator and the distances between the same points on both negatives are measured and recorded by the operator.

active environment need only be the short period required to take a number of photographs.

TOOLS AND METHOD

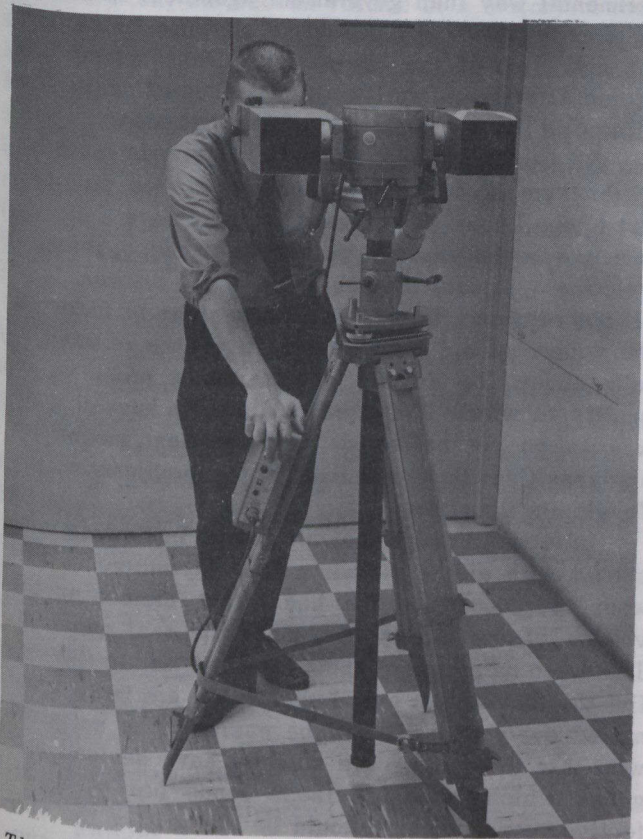
The new technique is called stereophotogrammetry and involves the use of four "tools" to obtain all the information required: a Wild C-40 stereometric camera, a Zeiss 1818 stereocomparator, a PDP-8 computer program and a Call-360 computer program.

The stereometric camera consists of two single-aperture cameras mounted on a known base-line and accurately aligned with optical axes parallel and in the same plane. The dual cameras take simultaneous shots of the same image, which is reproduced on two glass negatives. The two glass negatives are then aligned in the Zeiss stereocomparator. The positions of the same points on both negatives are recorded.

By converting these measurements into suitable formulae the true position and distance between any two points in the pictures can be calculated. The straight line joining the points does not have to be parallel to the planes of the photographs.

Ken Askey, of the Design and Technical Services Branch, has written a program for a PDP-8 computer that accepts these values and calculates the real distance between any of 45 different points. Working drawings can then be produced.

For larger jobs, Bernard Godden, Plant Design, has written a computer program that will accept the comparator measurements from multiple sets of photos and calculate positions from a common origin. These calculations are performed for the branch by an IBM-30 computer terminal.



The stereometric camera used in a new technique developed at Atomic Energy of Canada's Chalk River Nuclear Laboratories.