

THE INVESTIGATION OF GEOLOGICAL STRUCTURE BY MEANS OF AERIAL PHOTOGRAPHY

— In the Omachi Tunnel Area, as an Instance —

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SYNOPSIS

In case of water power development in Japan, so far, the aerial photogrammetry has scarcely been applied but to make the topographical maps for planning. We, authors, thought that aerial photography should be utilized not only for the purpose above said but also for many other purposes generally in water power development. Then we introduced a new technique called "Photogeology" and have carried out the investigations and studies, by the techniques, on each area in the basin of the River Kurobe, for the development plan.

It seems that photogeology has never been applied really to civil engineering in Japan. Therefore, in performing this research we had to resolve the elementary problems at first. And we have carried on the application in a way of "try and test".

In this paper, we show a research on the Omachi tunnel area above all as an instance.

An unexpected fault fracture zone caused a paralysis of the tunneling work through several months and enormous loss. This paper deals with how that fault fracture zone on aerial photographs appears and how the aerial photography in planning such tunneling works should be utilized in the future.

We, therein, compared the features appeared on aerial photographs with the values of fault dip and strike surveyed in the tunnel and other various investigated data, and inferred the mutual relations from it. We observed scrupulously drainages in each catchment area found in a strip having 1 km width on each side respectively north and south of the center-line coinciding with the central axis of the tunnel, and plotted them on a 1 : 5 000 map.

And then, we surveyed drainages for the number, length and direction in every catchment area, and graphed. The Schmidt-net was adopted for the graphing for the first time in Japan.

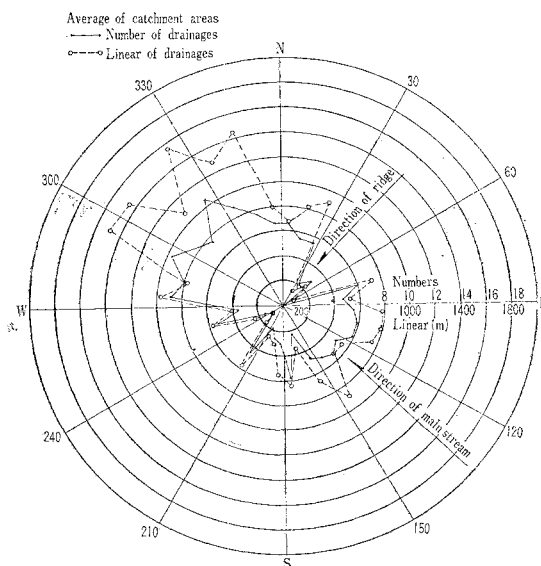


Fig. 1 Illustrated the topographic relation and frequency between the terrain and the drainage in each 10 degree sector clockwise from Noath.

By comparing these graphs, we have found that these drainages have parallel from and the frequency of their direction coincides with strikes of fault surveyed in the tunnel. To make the type of drainage definitely understandable we newly classified systematically the drainage patterns in Japan because they had not been classified clearly until then.

Moreover, we measured the density and frequency of drainage and made the comparative study of the mutual relations with varieties of bed rock, quoting certain instances in the united states of America.

We also touched upon topographical observation by stereogram and other methods expected in future for investigations.

This paper is not only a report on an experiment, but also it carries. We mentioned the authors opinion about the method for photogeology for the civil engineering and shows how to utilize the aerial photography.