Journal of Glaciology Vol. 26, No. 94, 1980

ABSTRACTS OF PAPERS PRESENTED AT THE SYMPOSIUM BUT NOT PUBLISHED IN FULL IN THIS VOLUME

PRELIMINARY RESEARCH ON PHYSICAL AND MECHANICAL PROPERTIES AND AVALANCHE OF SEASONAL SNOW COVER AT THE AVALANCHE STATION IN T'IEN-SHAN, CHINA

By ZHANG XIANGSONG *and* WANG YANLONG*

(Lanzhou Institute of Glaciology and Cryopedology, Academia Sinica, Lanchou (Lanzhou), Peoples Republic of China)

ABSTRACT. The mountains of western and central T'ien-shan have extensive snow cover and consequent avalanches, however conditions in this area of central Asia are different from those in many other regions with avalanches. Snow cover is not very thick but it experiences very large temperature gradients which dominate its metamorphism, thus depth hoar forms extensively and becomes the principal snow type, so the density therefore remains low as does mechanical hardness. Avalanching activity and total volume vary enormously from year to year; 1968–69, with 211 avalanches of 147 000 m^3, accounts for 53% of the avalanches and 75% of the volume of all the avalanches in the seven years 1967–74 in the area of the Gunes avalanche station. Although they can occur from November to April, the main months are January and March with a minimum in February. A snow depth of 50–60 cm is needed for avalanching. Below −10°C dry-snow avalanches occur, while above about −5°C wet-snow avalanches happen. These are often caused by melt water penetrating rapidly through the extensive depth hoar and initiating full-depth avalanches.

RECENT PROGRESS AND NEW APPLICATIONS OF THE DYNAMICS OF AVALANCHES

By GERARD BRUGNOT

(Division Nivologie, Centre Technique du Génie Rural des Eaux et Forêts, B.P. 114, 38402 Saint-Martin-d'Hères, France)

ABSTRACT. This paper reports the present stage in our research programme. We have used two very different models: (i) A numerical model treating the avalanche as a Newtonian liquid with a free surface; this model describes qualitatively the velocity fluctuations both of avalanche particles and of the front and gives some quantitative predictions, but much experimentation is needed to determine the large number of parameters involved. (ii) An analogue model in which powder avalanches have been simulated in an underground tunnel, taking account of the densimetric Froude number; this model reproduces the pressure rise which precedes the visible front, and also the pressure wave as the front passes which causes so much damage to engineering works—and human beings. These models have been applied to two cases—a bridge and a snow shed.

* Wade-Giles: Chang Hsiang-sung *and* Wang Yen-lung.