ROCKFALL CONTROL MANUAL

August 2000

JAPAN ROAD ASSOCIATION

PREFACE

Since the first printing of the “Rockfall Control Manual” published in 1983, it has been widely used as a practical manual for road engineers and serving as guidance for the rockfall control technique in Japan.

Not only does Japan have very precipitous terrain with rather fragile geology, it also has to deal with rainy season, torrential rain during Typhoon, earthquakes and heavy snow accumulation in winter season etc. These natural conditions have a very severe impact on road disaster prevention measures. Because of this, there have been many examples of impediments on road traffic caused by rockfall.

In recent years, social demands for road disaster prevention and improvement of road safety have been becoming increasingly stronger, and it is becoming an important challenge to conduct appropriate studies and establish proper design parameters, construction methods and maintenance/control procedures in order to prevent rockfall.

Under above background, the Japan Road Association has decided to completely update the “Rockfall Control Manual” which was published in 1983. In updating the manual, a thorough review of the latest technical trend was conducted by the Rockfall Protection Measure Sub-committee.

The latest knowledge about studies, design, construction methods and proper maintenance procedures was incorporated in this manual. I am looking forward to the effective use of this manual, and hoping that everybody concerned would make the utmost effort to develop new methods for rockfall prevention.

June 2000

Michio SUZUKI, Chairman, the Japan Road Association

INTRODUCTION

Our roads in Japan are built under very severe natural conditions since much of the country has precipitous terrain with rather fragile geology, and located in rainy and snowy region. In addition, Japan is one of the most earthquake-prone countries in the world. Under such very difficult conditions in terms of disaster prevention, rockfall often occurs even in recent years.

Under the present technological state, it is extremely difficult to accurately predict rockfall, and motion and collision pattern of falling rocks are not well known. Consequently, disaster prevention by traffic control or design of protection facility etc still owes much to the past experiences and the judgment in the field. For this reason, it was required to provide field engineers, who design and construct rockfall prevention facilities, with the manual that systematically assemble current knowledge and reference material. Thus, the “Rockfall Control Manual” (first edition) was published in 1988.

Even after publishing the first edition, rockfall prevention technology has still been developing, and data on observations of actual rockfall, method of study and design, based on field observations and various experimentations, have been accumulating. In order to collect the latest study results and research accomplishment etc regarding rockfall prevention, facility design and maintenance scheme etc, and make them available to field engineers for their proper interpretation and judgment, as well as to contribute to the further development, the contents of the “Rockfall Control Manual” are enhanced and updated. Major revisions are listed below.

1). Slope investigation process was revisited based on the actual records of rockfall disaster and the improvement in the investigation method. Investigation process is clearly indicated, and more universal methods for slope investigation and the latest monitoring methods are incorporated.
2). Design process and detailed structure of rockshed, rockfall prevention fence and rockfall protection wall are revised.
3). New chapter for maintenance, and descriptions on maintenance and control of slope and rockfall prevention facilities are added.
4). Although, this manual mainly deals with rockfall of ordinary scale, the current knowledge about bedrock collapse were reviewed and added in the reference section.
5). Due to the introduction of SI units, all units are indicated in SI Units.

Latest possible information, including one under development, has been collected and incorporated into this manual. I eagerly anticipate that invaluable experiences would be accumulated and rockfall disaster prevention would be promoted by adopting new technologies.

It is hoped that this manual is actively utilized and contributes to better road maintenance.

June 2000

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