ANALYSIS OF THE RECULTIVATION OF THE EXTENSIVE CALCIT QUARRY

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INTRODUCTION

Article is presenting the analysis of recultivation of the northern part of the extensive Calcit quarry. Recultivation has begun in 2001, when the economic exploitation of the highest level (terrace) has come to its end.
The basic purpose of recultivation was environmental improvement of degraded landscape and reduction of rockfall risk for the works that were continued on the lower levels. With combination of up-todate soil bioengineering techniques the following goals have been followed:

- weathering intensity reduction
- prevention of surface erosion
- grassing and planting of degraded areas
- overgrowing acceleration
- successful integration formerly degraded ares in the landscape

Since the excavation of calcite on lower levels continued, reduction of the slope inclination, which is the standard approach to quarry restoration and recultivation, was not possible. Because of the number of unfavourable natural conditions and extreme growing conditions for vegetation that are present in the quarry, recultivation of the Calcit quarry offers good possibilities to analyse the extreme limits of applicability and effectiveness of bioengineering techniques. The results are very important as it will be possible to apply the acquired practical experiences in the similarly harsh natural conditions.

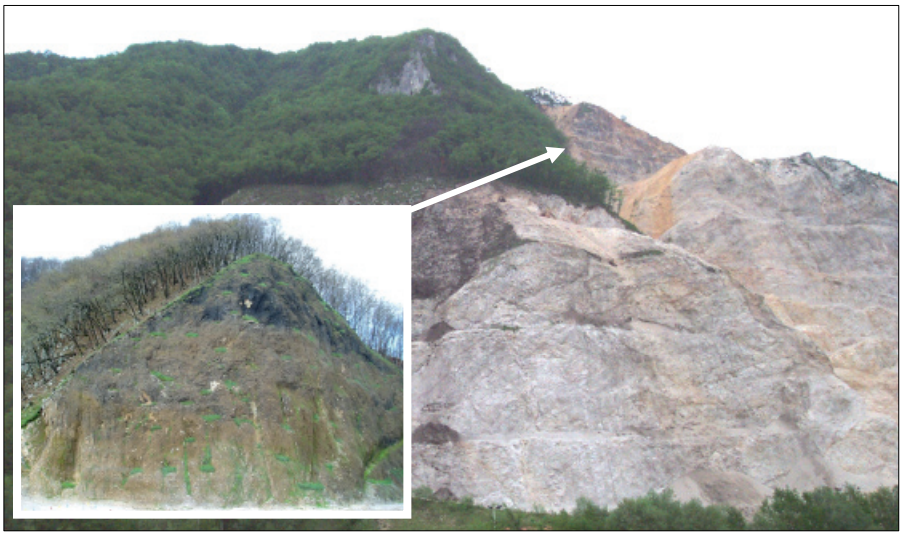

Fig. 1: Recultivation works are carryied out from top down and follow the dynamic of quarry exploatation

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RECULTIVATION OF DEGRADED AREAS IN SLOVENIA

By Slovene legislation, the holder of the mining rights is obliged to cover all the costs necessary to restitute the damage caused by exploitation of natural recources. After termination of the exploitation, the holder of the rights is obliged to carry out the final restoration of the degraded site and eliminate all the consequences of the exploitation. In the areas, where complete restoration measures are not possible, the protective measures to eliminate the possible risk for life and health of people and animals have to be carried out. In these cases the wound in landscape remains. With the Calcit quarry recultivation an important step has been made also towards recultivation of the areas, for which it was believed, not long ago, that cannot be successfully restored.

PRACTICAL EXPERIENCE IN THE QUARRY "CALCIT"

Calcit quarry is situated on the SE slope of the Kamniška Bistrica torrent valley, next to the settlement Stahovica. In the year 1996 a new »from up to down« method of excavation was introduced. From the ecological point of view this method is more appropriate, because it allows immediate recultivation of the upper, already exploited levels, while the calcit is still being excavated on the lower levels. On the other hand, the recutivation itself is much more difficult, since the reduction of the slope is not possible. Therefor the slope was very steep and surface stony and almost without fertile substratus. Company PUH d.d. which carried out the recultivation, had to carry out the necessary rockfall control mesures for the safety of the workers that were continually working on the lower levels, and simultaneously carried out the recultivation by using different soil bioengineering techniques (mulchhydroseeing, plant cores technique , planting on teraces,...)

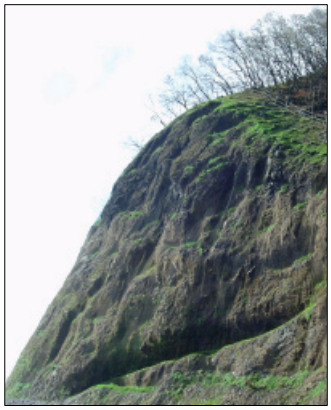

Fig. 2, 3, 4: Mulchhydroseeding and planting in plant cores technique gave satisfying results

Though the conditions for carrying out the recultivation works and for the growth of the vegetation as well were extreme, the techniques proved to be successful. With the combination of different soil bioengineering techniques the successive processes of natural overgrowing can be crucially accelerated also in extreme conditions, where these processes are otherwise running very slowly or they have no chance at all. It is important to stress out that beside the applied techniques, the final success depends very much on the cooperation between the quarry management and the performer of the recultivation works. While excavating calcit, the quarry workers have been simultaneously removing all labile rocks , have been avoiding the creation of overhang parts on the slope and, according to the instructions, have been already designing special niches and shelves, necessary for later preparation of plant cores and thus enabled successful use of bioengineering measures.

Keywords: Soil Bioengineering Techniques, Bioengineering, Recultivation, Quarry, Rockfall Protection, Degraded Landscape