

FOLLOW-UP SLOPE EXPERIMENTS
AT FORDING COAL LIMITED

Paper prepared jointly
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FORDING COAL LIMITED

FOLLOW-UP OF SLOPE EXPERIMENTS
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INTRODUCTION

Fording Coal Limited operates the Fording River Coal Mine in southeastern British Columbia.

Fording Coal ownership is 60 percent Canadian Pacific Investments and 40 percent Cominco Limited. The operation produces 3 million long tons of metallurgical coal annually primarily for export to Japan.

Coal extraction involves the use of both truck-shovel and dragline mining during which some 25 million bank cubic yards of waste are handled annually.

This paper discusses a study initiated in 1977 which was designed to investigate optimal resloping techniques used in waste dump reclamation. Waste dumps at an elevation of 1700 metres were resloped from 37 degrees to a range of slope angles from 24 to 34 degrees with various aspects. Dump material consisted of carbonaceous mudstones, siltstones and sandstone.

A 15 to 30 centimetre layer of calcareous glacial till was placed over portions of the 26, 28 & 30 degree areas to compare relative stability and revegetation potential with waste rock. Hydroseeding with a grass legume mixture followed.

This paper summarizes the conclusions of the 1977 observations which discussed equipment limitations, stability and costs and discusses 1978 follow-up work mainly with respect to revegetation.

REVIEW OF STUDY OBJECTIVES

Specific Study Objectives Were:

1. To establish resloped areas with varying slope angles, exposure and base materials to allow field reclamation research to determine vegetation growth on slope angles with varying conditions.
2. To evaluate equipment performance, safety, planning and operating guidelines when resloping waste dumps at various angles.
3. To establish field reclamation research in locations representative of principal mining methods.
4. To initiate full scale reclamation work in areas of final spoiling.

The underlying theme of this research is the optimizing of available spoiling areas and reclamation efforts. This is particularly important at the Fording River Operation as available spoiling areas are limited, because of the narrow valley and proximity to streams and support facilities.

SUMMARY OF 1977 CONCLUSIONS

Observations of Work Carried out in 1977 Can be Summarized as Follows:

1. Equipment used (D-8, D-9 and D-6 Crawler Dozers) worked most effectively on slopes up to 28 to 30 degrees. This equipment had a natural tendency to cut slopes to 28 degrees. Slopes from 30 to 34 degrees resulted in cross pushing with low productivity and deep track markings.
2. At angles above 28 degrees, the dozers would climb effectively in a forward position only. Reverse climb was possible but resulted in low productivity.

3. Total resloping costs encountered ranged from 1890 to 4350 dollars per plan acre worked with an average of 3270 dollars per acre. Total resloping costs expressed per loose cubic yard moved ranged from 28 to 41 cents with an average of 37 cents per loose cubic yard. Slopes ranged from 27 to 49 metres in length.
4. Stability and drainage appeared adequate on all slopes from 24 to 34 degrees. Small circular failures were encountered on 32 to 34 degree slopes but appeared to be related to isolated areas of fine wet material.
5. Generally it appears that from an operational point of view, waste dump slopes can be worked to 28 to 30 degrees. Operator safety, drainage, and surface stability appear to be adequate.

DISCUSSION OF 1978 FOLLOW-UP WORK

From an Assessment of the Study Area Conducted in 1978, the Following Observations can be made:

1. Seedling populations were similar for all slope angles, aspects and positions. Seedling density on all slopes was adequate to provide dense vegetations during subsequent growing seasons.
2. Grass seedling density was significantly greater on waste rock than on glacial till covering waste rock. However, seedlings grown on waste rock were very small and severely chlorotic relative to seedlings grown on glacial till.
3. Glacial till placed on 26, 28, and 30 degree slopes eroded readily and large amounts of fines collected at the toe of slopes. Waste rock slopes did not erode.

4. Data collected during the first growing season indicated that grasses will establish satisfactorily on waste rock slopes with angles ranging up to 34 degrees provided there are sufficient fines on a stable surface. Additional time is required to evaluate long-term effects of slope angle and aspect on plant growth and surface stability.

REFERENCES

1. Popowich, J., Spoil dump resloping at Fording River Operations.
2. Stathers, J.E. & Gardiner, R.T., Annual Reclamation Research Report.
1978/1979.