TR18_100_102

14. Treatment of cuttings at Tolmans Hill, Hobart

D.E. Leaman

The extensive cuttings along the Southern Outlet Road in the region of Tolmans Hill have been described in detail by Moore (1975) who clearly demonstrates that they are at present quite unsafe. If these cuttings are to be made safe, any remedial treatment must take account of the properties of the dolerite.

There are a number of possible treatments, dependent largely on future intentions concerning the road.

(1) *The second carriageway placed as originally conceived.*

	Volume of rock to be removed (m^3)		
Solution	1	2	3*
Cut A	70000	105000	150000
B	3000	3000	5000
C	600	600	1000

*Only solution 3 can be considered safe.

The above figures are minimum estimates, and assume the construction of a second carriageway with a sealed surface 7 m wide and shoulders at least 3 m wide. Much of the material to be removed, if the carriageway is to be built, will be derived from points where the present cutting is inadequate for a second carriageway.

Solution 1 represents the amount of material to be removed in order to reduce the blatant danger areas. Benches with a maximum height of 8 to 9 m and a depth of 3 m are suggested. The finished slope is about 70° overall.

Solution 2 represents a fuller treatment for increased stability. The finished slope is about 60-64° overall.

Neither of solutions 1 and 2 could be regarded as safe if a carriageway is built immediately below cuts A or B.

Solution 3 provides for a reduction in slope to 54° overall in the case of cut A and allows for benches 5 m wide so that clearing may be expedited. In quarrying practice in this State, where safety factors are not as stringently maintained, operators are required to ensure that faces in dolerite do not exceed 9 m in height and the face must slope at 70° or less. In addition the benches should be 4 to 5 m wide and preferably have some dip into the hill if they are narrow and be so arranged as to allow vehicular access for maintenance purposes. Our Mining Engineers, who are also responsible for quarries, consider these to be minimum safety requirements and obviously the placement of a public road at the base of such a cut would require higher standards. My observation of dolerite leads me to agree wholly with their appraisal and that overall slopes should not exceed 55°.

Face heights should never exceed 9 m, and should be lower than this unless the rock is in very good condition, likely to stay that way, and has been pre-split. None of these conditions apply at Tolmans Hill, where in many places the cut height should not exceed 5-6 m even if carefully pre-split and in others should not exceed 2 m (as noted by Moore).

Operational modifications to cut A will require special care and use of appropriate and well supervised blasting techniques. Advice on blasting

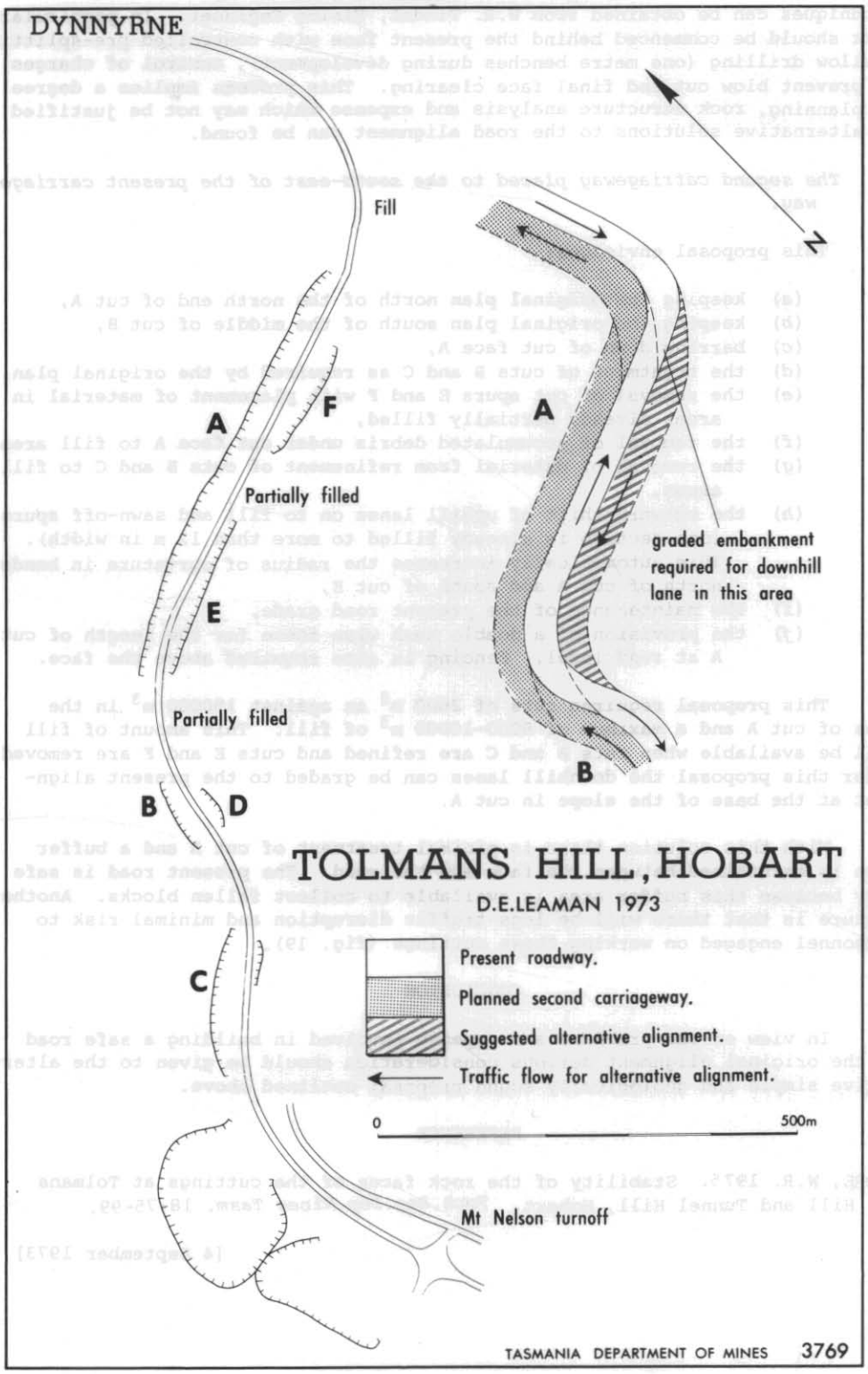
5 cm
DYNNYRNE
Fill
A
F
Partially filled
E
Partially filled
B
D
C
A
B
graded embankment
required for downhill
lane in this area
N
TOLMANS HILL, HOBART
D.E.LEAMAN 1973
Present roadway.
Planned second carriageway.
Suggested alternative alignment.
Traffic flow for alternative alignment.
0
500m
Mt Nelson turnoff
TASMANIA DEPARTMENT OF MINES
3769

Figure 19.

techniques can be obtained from W.R. Tindal, Mining Engineer. In particular, work should be commenced behind the present face with controlled pre-splitting, shallow drilling (one metre benches during development), control of charges to prevent blow out and final face clearing. This process implies a degree of planning, rock structure analysis and expense which may not be justified if alternative solutions to the road alignment can be found.

(2) *The second carriageway placed to the south-east of the present carriageway.*

This proposal envisages:

(*a*) keeping the original plan north of the north end of cut A,
(*b*) keeping the original plan south of the middle of cut B,
(*c*) barring down of cut face A,
(*d*) the treatment of cuts B and C as required by the original plan,
(*e*) the removal of cut spurs E and F with placement of material in areas already partially filled,
(*f*) the removal of accumulated debris under cut face A to fill area,
(*g*) the removal of material from refinement of cuts B and C to fill areas,
(*h*) the outward shift of uphill lanes on to fill and sawn-off spurs (one section is already filled to more than 12 m in width). This automatically increases the radius of curvature in bends north of cut A and south of cut E,
(*i*) the maintenance of the present road grade,
(*j*) the provision of a double mesh wire fence for the length of cut A at road level. Fencing is also required above the face.

This proposal requires cuts of 2600 m^3 as against 150000 m^3 in the area of cut A and a maximum of 8000-10000 m^3 of fill. This amount of fill will be available when cuts B and C are refined and cuts E and F are removed. Under this proposal the downhill lanes can be graded to the present alignment at the base of the slope in cut A.

With this solution there is minimal treatment of cut A and a buffer zone is maintained between the face and the road. The present road is safe only because this buffer area is available to collect fallen blocks. Another feature is that there will be less traffic disruption and minimal risk to personnel engaged on working these cuttings (fig. 19).

CONCLUSION

In view of the problems and expense involved in building a safe road on the original alignment serious consideration should be given to the alternative simple and geologically sound proposal outlined above.

REFERENCE

MOORE, W.R. 1975. Stability of the rock faces of the cuttings at Tolmans Hill and Tunnel Hill, Hobart. *Tech.Rep.Dep.Mines Tasm.* 18:75-99.

[4 September 1973]