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SKIDDING TRACKS FOR STEEP TERRAIN

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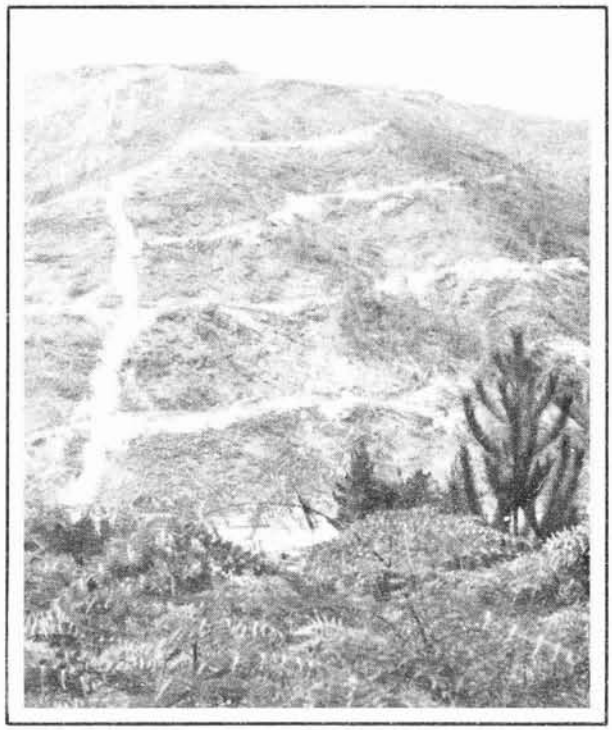

Contour tracking formation

INTRODUCTION

Skidding systems for logging on steep terrain could be an attractive alternative to the high cost of hauler extraction. Any ground based system, however, must satisfy both environmental and safety constraints, as well as yield sufficient production to be economic. One method to extend the capabilities of skidders and tractors on steep terrain is the use of contour tracking. This report gives broad based guidelines for the planning and construction of contour tracks.

ACKNOWLEDGEMENTS

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CRITICAL FACTORS

Before any area can be planned for logging with contour tracks, there are four important considerations that must be taken into account. These are :-

(1) *Degree of slope* - the maximum side slope that can be safely logged using tracks, is 75%. It is important to have access to the bottom of slopes to enable downhill pulling.

(2) *Shape of terrain* - contour tracks are best suited to long even slopes. Broken terrain and rock outcrops pose difficulties in both track formation and logging off them.

(3) *Soils* - it is essential that ground conditions are stable and well drained. Any area prone to slipping or slumping would be unsuitable for tracking.

(4) *Climate* - although closely related to soil stability, the effects of high rainfall on exposed ground must be carefully examined to ensure that tracking is possible.

PLANNING FOR TRACKING

When a decision has been made to use contour tracks for logging, good planning is the key to a successful operation. Well placed tracks become an asset to management of the land and can be used in successive operations. It is imperative that they are correctly planned and properly constructed.

ROAD LAYOUT

Roads should preferably provide access to the bottom or lower regions of the slope and be of sufficient quality to stand up to the passage of logging trucks over them. Planning of the location and density of roads should aim for extraction distances to be kept to a minimum.

LANDING LOCATION

Landings are the interface between the bush work and transportation phase of an operation, so they must be strategically placed to benefit both. Where a slope runs into a wide, flood free valley, the landings can be constructed on the flat, but when a slope drops off into a steep sided gulley, the landing should be located on the ridges or spurs (refer Fig. 1).

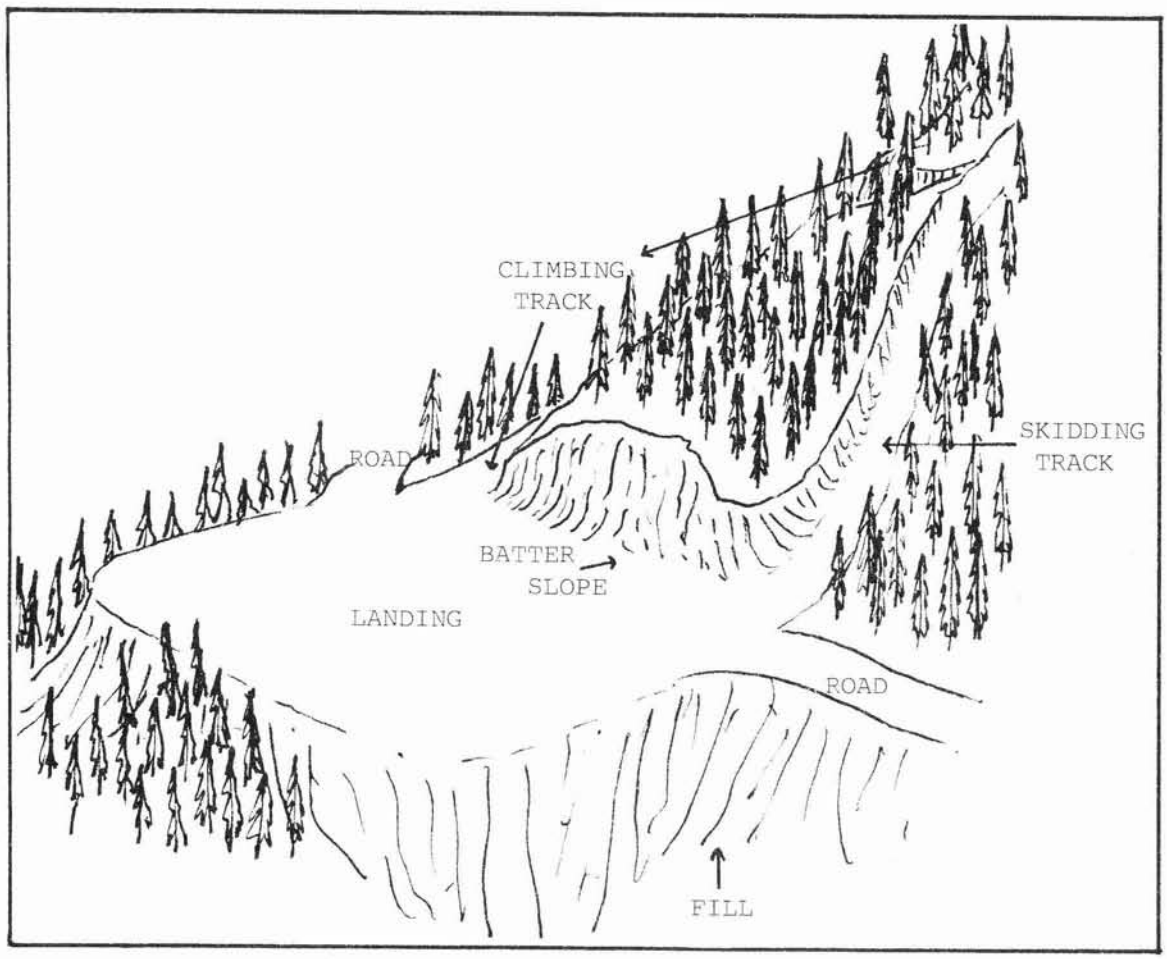

Fig. 1 - Landing location on spur

Tracks leading on to these landings from the spurs will have to be side-cut and enter from the side (refer Fig. 1). Landings should be of adequate size to stockpile the expected production from the logging, according to the cutting patterns followed and the frequency of loadouts.

TRACKING PATTERN

A system of contour tracks is comprised of : a climbing (or access) track, a skidding track which might also be used for access, and a series of contour tracks running off the access and skidding tracks at regular intervals up the slope (refer Fig. 2). The purpose of putting in climbing tracks is to enable all-weather logging operations to take place when it is not possible to climb the skidding track.

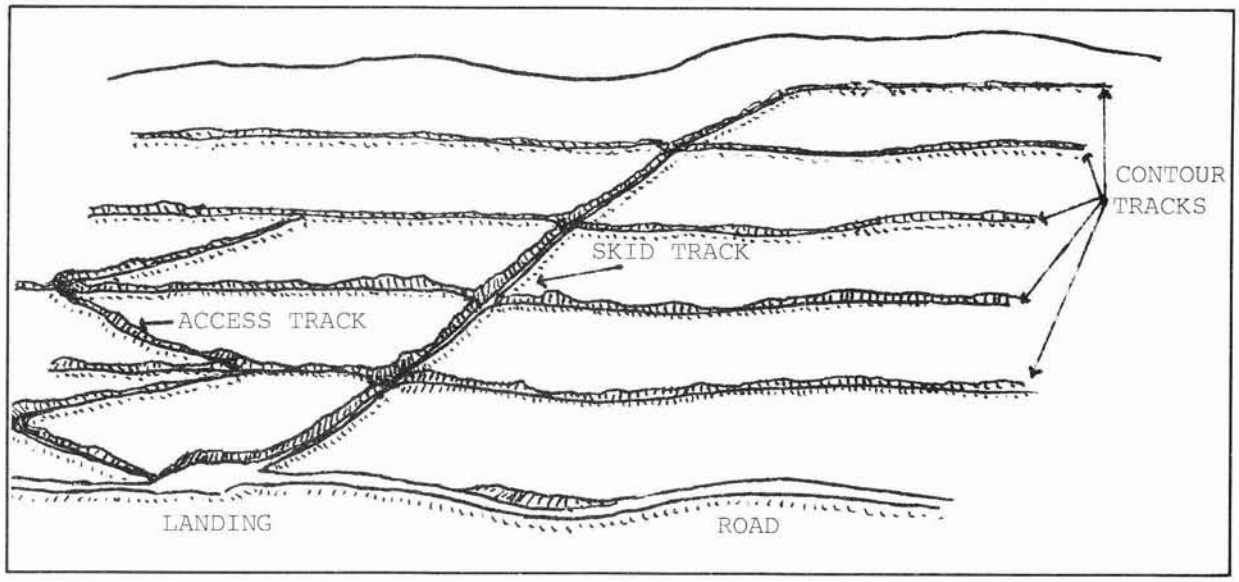

Fig. 2 - Contour tracking pattern

Climbing tracks can have a gradient of up to 33% (depending on soil conditions), and skidding tracks should be kept below 50%. Where possible, climbing and skidding tracks should run up and down the ridges or spurs. Contour tracks should be kept horizontal to minimise the effect of water run-off. Track density can vary according to the type of logging operation, but around 300 metres per hectare is considered to be the optimum level. This gives a spacing of one track at every thirty metre interval up the slope. To keep the operation economic, haul distances on tracks should not exceed 400 metres, although it may be necessary to extend this to reach isolated pockets of bush.

FORMATION OF TRACKS

For precise control over track locations, it is desirable for all tracks to be marked prior to construction. This is easiest done with two men, a compass, an "Abney" level and a thirty metre tape. It is important that the exit points of the contour tracks are correctly marked on the skidding track. The most satisfactory method of doing this is to firstly mark in the skidding track, then the bottom contour track as far as is necessary. (Experienced bulldozer operators can usually keep a track level once ten or fifteen metres is formed). The next step is to measure straight up the slope to the track above and mark that back to the skidding trail (refer Fig. 3).

Two options exist for tracking - pre-tracking, or tracking and logging concurrently. Pre-tracking allows better control through closer supervision, and enables areas to be prepared for logging in advance. Tracking and logging concurrently is a cheaper option, but requires more supervision and gives less control.

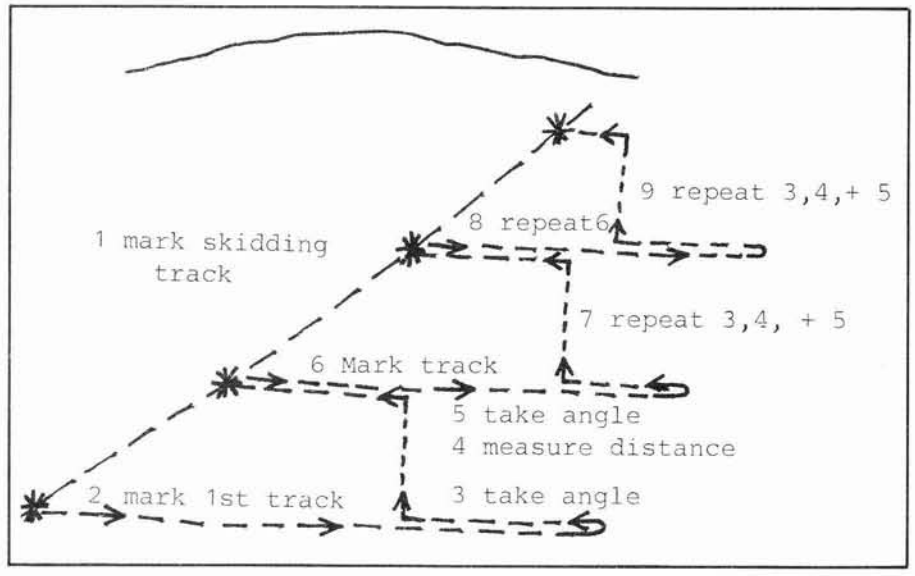

Fig. 3 - Marking tracks (follow arrows)

OPERATING FROM TRACKS

Loggers should be made fully aware of the fundamentals of operating skidders or tractors on tracks :

- *Keep to the tracks* - deviations across slope or from one track to another could result in a roll-over.
- *Don't speed* - high speed with a full load on is dangerous. Care should be taken to keep logs on the skidding tracks.
- *Consider other workers* - particularly when breaking out and approaching the skids.
- *Take care when winching* - the machine should be positioned for straight line of pull. Beware of the drag hanging up during breakout.
- *Leave rub trees or high stumps* when turning on to a skidding track or pulling across a gut.
- *Avoid excessive blade work* - this can lead to erosion problems at a later stage.
- *Keep machines well maintained* and regularly inspect brakes, etc. All wheel braking systems are preferable.

RUN-OFF CONTROL

Because the skid tracks and climbing tracks run across the contours, they create an ideal channel for water run-off. It is, therefore, necessary to put in cut-offs at regular intervals, across the tracks, to divert this water back into the logged area. These cut-offs should be at 45° angles across the track and should lead into the areas of cutover between tracks.

CONCLUSIONS

This report has outlined general guidelines that should be followed when contour tracking. The criteria is by no means complete and will not necessarily apply in every situation. The two most important points that should be remembered are :-

(1) Contour tracks become a permanent feature of the landscape and, therefore, should be carefully planned and constructed.

(2) Safety of the loggers doing the job is of utmost importance. This should be a major consideration.

The objectives here have been aimed at making planners, logging managers and loggers aware of the logical steps that should be followed before implementing a contour tracking system.

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