



## Bulldozer Brake Failure

### INCIDENT

A forestry worker was killed when the Caterpillar Model 527 bulldozer he was operating rolled over a track when the foot brake linkage failed.

### CIRCUMSTANCES

The worker was employed by a forestry contractor who was harvesting logs.

He was operating a Caterpillar bulldozer (Model 527) to extract logs. He was about to pull a third drag of two logs up a 34 degree slope to the skid site, but before he had started to winch the logs, the machine ran backwards over the edge of the track and down the hill, coming to rest 40 metres below. The worker was found unconscious and unrestrained in the cab.

### INVESTIGATION

The Department of Labour's investigation noted the following in regard to the machine and its use:

- The deceased was an experienced and competent operator.
- The bulldozer was new in 2003 and had only worked for 5995 hours at the time of the accident.
- In June 2004 while the machine was under warranty, the engine and torque converter was removed by the Caterpillar agency for repairs due to a fault with it. Repairs would not normally be expected to be needed until approximately 15,000 to 20,000 hours had passed.
- An analysis by a metallurgy consultant revealed that the brake linkage may have been bent and straightened some time prior to the accident, and subsequently broke. The consultant expressed the view that this bend would have not been sufficient to cause the failure. Instead, he felt the damage to the brake linkage may have been caused by incorrect routing of a hydraulic hose, generating additional fluctuating stress along the threaded portion, and leading to fatigue cracking.
- It is possible that the initial damage inadvertently occurred during maintenance or repair work, e.g. standing on or levering off the linkage; or during initial manufacture of the machine.
- An inspection of the machine post-accident found that the hand brake was in good order.
- The machine was fitted with a certified ROPS (Roll Over Protection Structure) canopy and seatbelt. Had the operator been wearing the seatbelt at the time, it is likely that his injuries – if any – would have been minimal.



1

View of the toppled bulldozer where it came to rest.



2

View of the newly-fitted brake rod.



## DEPARTMENT OF LABOUR ADVICE

Seatbelts must be worn when operating plant with ROPS.

It is important to be aware that damage could occur to safety-critical parts such as brake linkages during maintenance and repair work. Such parts should be checked before the machine is put back in service.

Hydraulic and transmission hoses should be checked to ensure that they are refitted/replaced to the manufacturer's specification, and not placed in a position where they may affect other parts.

*Note: This material has been prepared using the best information available to the Department of Labour at the time of publication. Information may change over time and it may be necessary for you to obtain an update. This material is also only intended to provide general advice and does not constitute legal advice. You should make your own judgement about action you may need to take to ensure you have complied with your workplace health and safety obligations under the law.*

## WHICH INDUSTRIES/SECTORS OR MATTERS WILL THIS INFORMATION BE RELEVANT TO?

Forestry contractors, mechanics, machinery agencies, maintenance companies and construction companies.

