



Operator Protection Against Chain Shot

Background

In April 2004 an operator of a mechanised harvester was seriously injured when the $\frac{3}{4}$ -inch saw chain of the felling head broke, firing a piece of chain through the front window of the machine fracturing the operator's skull. Other 'chain shot' accidents have since occurred.

The speed of the chain and the energy created as the broken chain whips around can cause pieces of the chain to break away and be thrown at a high speed equivalent to that of a rifle bullet.

The trend in mechanised harvesting in New Zealand has been to use modified excavator carrier bases with roll over protective structures (ROPS) fitted with polycarbonate windscreens, but no prerequisite standard has been applied to the ROPS modifications.

Investigation

Following this accident, the local manufacturers of mechanised felling and processing attachments designed and fitted a deflector device to their respective saw units based on a recent Swedish research study. No such deflector device was available in New Zealand at the time of this accident.



Felling head showing broken chain



View from inside operator's cab

The investigation found that these devices had only recently been identified overseas as a means of controlling this hazard.

Recommendations

Recommendations resulting from the investigation are:

- That the Department of Labour coordinates an industry plan to determine a standard for operator protective structures (OPS) for mechanised harvesters; and
- Operators should identify the danger zone and safety precautions for mechanised harvesters used in log landings.

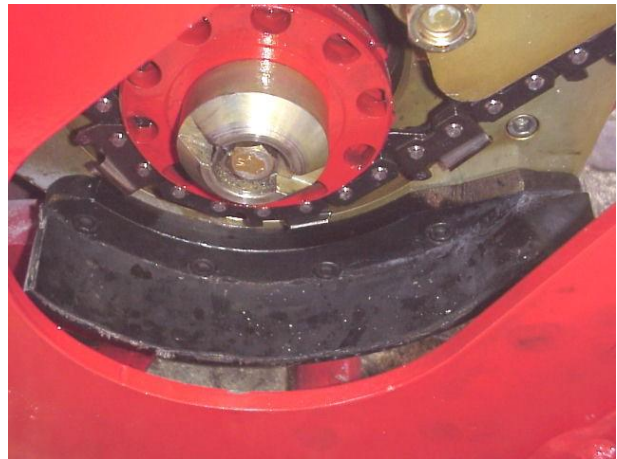
The Department has sought industry development of such a standard and guidance on operational practice but needs to 'fast track' these recommendations in light of what we know about this hazard.

Interim Guidance

This bulletin is intended to provide the forest industry with knowledge of the hazards associated with mechanised harvesters and interim guidance on the practicable steps that owners and operators of mechanised harvesters can take to avoid serious harm.

Owners and operators of mechanised harvesters should adopt the following practices and modifications to OPS and harvester heads:

- Ensure a 12.7 mm or greater polycarbonate or laminate equivalent front OPS window is installed.



Deflector and chain catcher peg

Photo taken from Waratah Safety Information Bulletin

- Ensure operators and bystanders stay clear of the plane of the saw bar when operational.
- Control chain's speed to below 35 m/s for $\frac{3}{4}$ -pitch chain or 40 m/s for 0.404-pitch chain.
- Install a chain shot guard near the drive sprocket.
- Inspect chain frequently and remove damaged or cracked chain from service.
- Remove dull chain from service.
- Maintain proper bar and chain lubrication and chain tension.
- Replace the drive sprocket when visibly worn.

Implementation

Owners and operators of mechanised harvesters should undertake these modifications and implement these operational practices as soon as practicable.