Hancock Forest Management

24th June 2015

SAFETY ALERT

Cable Assist Drawbar - Mechanical Failure

Background

A cable assisted feller buncher was walking down a 20 degree slope, as it turned to go around a tree the eye of the drawbar failed catastrophically. The failure allowed the shackle connecting the feller buncher to be pulled through the eye of the drawbar and left the feller buncher without cable assist. The feller buncher remained stable during the incident.

The drawbar had been certified in September 2013 to 24 tonne SWL.

The drawbar and operator have contributed in excess of 3000 hours of cable assist.

Photo 1: Draw bar

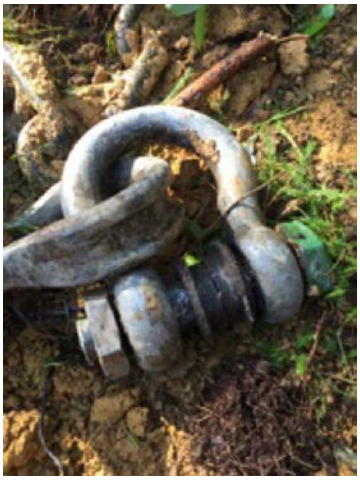

Photo 2: Shackle with remnants of eye on pin

Photo 3: Eye of draw bar

Contributing factors:

- The engineering of the drawbar restricted the shackles movement laterally. When a lateral force was applied (ie every time it was not in a straight line) both the drawbar and shackle were exposed to significant forces. Continual lateral use led to the drawbar suffering from metal fatigue to the point of failure.
- Engineering calculations used to certify the drawbar focussed on direct pull (vertical) rather than side (lateral) pull.
- A shackle is designed to achieve 100% of it Safe Working Load (SWL) when it is pulling straight (in line) and it is unrestricted vertically or laterally. Any restriction, vertically or laterally, on the shackle is likely to cause significant forces that may, in time, cause failure of

the shackle, shackle pin, or drawbar and is likely to significantly reduce the SWL of the shackle and / or the drawbar.

- Evidence of metal fatigue (photo 4) was identified during an audit and a program to replace the drawbar was in progress at the time of the incident.
- The reaction to the visible signs of fatigue and delegating a probability of catastrophic failure were over optimistic.

Photo 4: Eye of draw bar, two days before failure, visible signs of swelling and sharp edges

What needs to be done:

- In this instance a new drawbar has been designed and certified to ensure that the shackle constantly stays in-line, is subject to near zero lateral or vertical resistance, and is able to maintains its SWL.
- All feller bunchers using this cable assist product will be fitted with the new drawbar system.
- Ensure all cable assist drawbars fitted to feller bunchers are designed and certified for both direct (vertical) and sideways (lateral) pull forces.
- That future drawbar design must aim to provide near zero lateral or vertical resistance to any connecting part.
- Documented drawbar inspections must be conducted daily to identify visible signs of fatigue.
- All feller bunchers operating cable assist, however frequently, must have the drawbar certified and the following information must be on the affixed certification plate:
  - The owner of the mobile plant
  - Make, model, serial number
  - Certification expiry date
  - Certifier number

Remember:

- Evidence of fatigue on any system part, and especially those that lack a backup, must be treated with urgency.

- Rigging registers should include advice, written or photographic, on objective ways to measure wear and tear including acceptable tolerances and advice as to repair / replace consumable parts in the cable assist system.