

ENGINEERING SAFETY SOLUTIONS

Reducing the risk of falling from a Madill 124 swing yarder

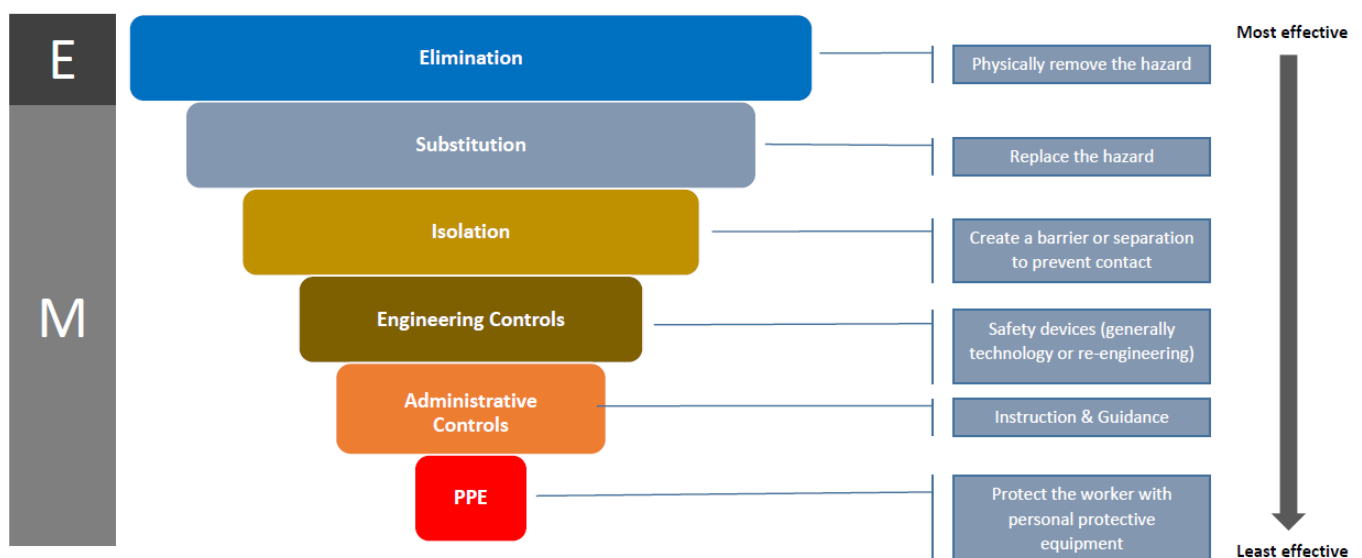
In a perfect world we strive to **ELIMINATE** risks to health and safety. As we know this is not always possible—either the tools or technology doesn't exist or it will be financially unviable. So we are then required to take a closer look at how we could **MINIMISE** the risk. Options may include :

- **Substituting** (totally or partially) the hazard that creates the risk with something of lesser risk, an example of this would be replacing manual felling with mechanized felling where possible.
- **Isolating** the hazard to prevent contact, an example of this would be temporary traffic control when felling within two tree lengths of a road.
- **Implementing** engineering controls, an example of this would be a cut-out or disable switch.

These three types of controls are far more reliable than the next layer of controls.....that is rules and procedures, followed by the use of personal protective equipment. This layer of controls is prone to human failure.

Engineering controls or engineering safety solutions is the subject of this case study.

Hierarchy of controls



When working around forestry machines, one of our greatest risks is falling from heights. While working with haulers, some of the routine activities that is crucial to machine operation need to be done at an elevated position, sometimes as high as 14m from the ground. Although fall arrest harnesses are provided for this work, there is some doubt that they are used all the time.

People have reported not using the harness because it's difficult to fit it correctly, it takes time to fit, there is not enough attachment points on the machines, and that they "feel safe" going up the gantry ladder without a harness. Obviously these are poor excuses for not using a crucial piece of safety gear, and yes, we know its mandatory to use it, but based on the comments from people in hauler crews, the real concern is , what happens when there's no one around to force people to wear a harness, the person is not trained in the use of it or it's not fit for purpose?

The solution is to remove the need to work at heights and the exposure to the risk. This can be achieved with engineering solutions. The purpose of this document is to illustrate how some innovative engineering solutions have reduced the need to work at heights on a Madill 124 using yarder owned by Ocean View Logging.

Back story

Danny Arbuckle (RAL Logging) originally owned this swing yarder. The current owner is Steve Rist from Ocean View Logging. Steve was Danny's foreman and hauler driver and has since bought the business from Danny. Steve is a very experienced swing yarder operator and understands the inherent risk involved in working with swing yarders.

Danny made a number of improvements to the hauler during his time of ownership. Some of those changes were made after they had incidents and there was a potential for serious harm. Danny's focus was to eliminate or reduce the risks that are created when working at heights.

Steve has continued making improvements and changes to this machine to further reduce the need for people to perform work at heights.

Steve's philosophy is simple, "I don't want anyone being hurt on my machines, if there is a smarter way of doing it, I'm going to find it"

Rayonier / Matariki Forests would like to take this opportunity to congratulate and thank Danny Arbuckle and Steve Rist for their innovation and commitment to seeking solutions higher up on the risk control hierarchy and their willingness to share with the industry.



Access / Egress Modifications

The modifications made to improve access and egress, includes:

- New handrails fabricated and fitted at the base of the hauler, this allows a person to maintain 3 points of contact when accessing the hauler from the ground.
- All areas of foot traffic had anti-slip adhesive applied to reduce the risk of slipping in wet and muddy conditions, or oil spills.
- Secure railings fitted, all around the machine .
- They installed a camera that allows the operator to monitor the drums from inside the cab.



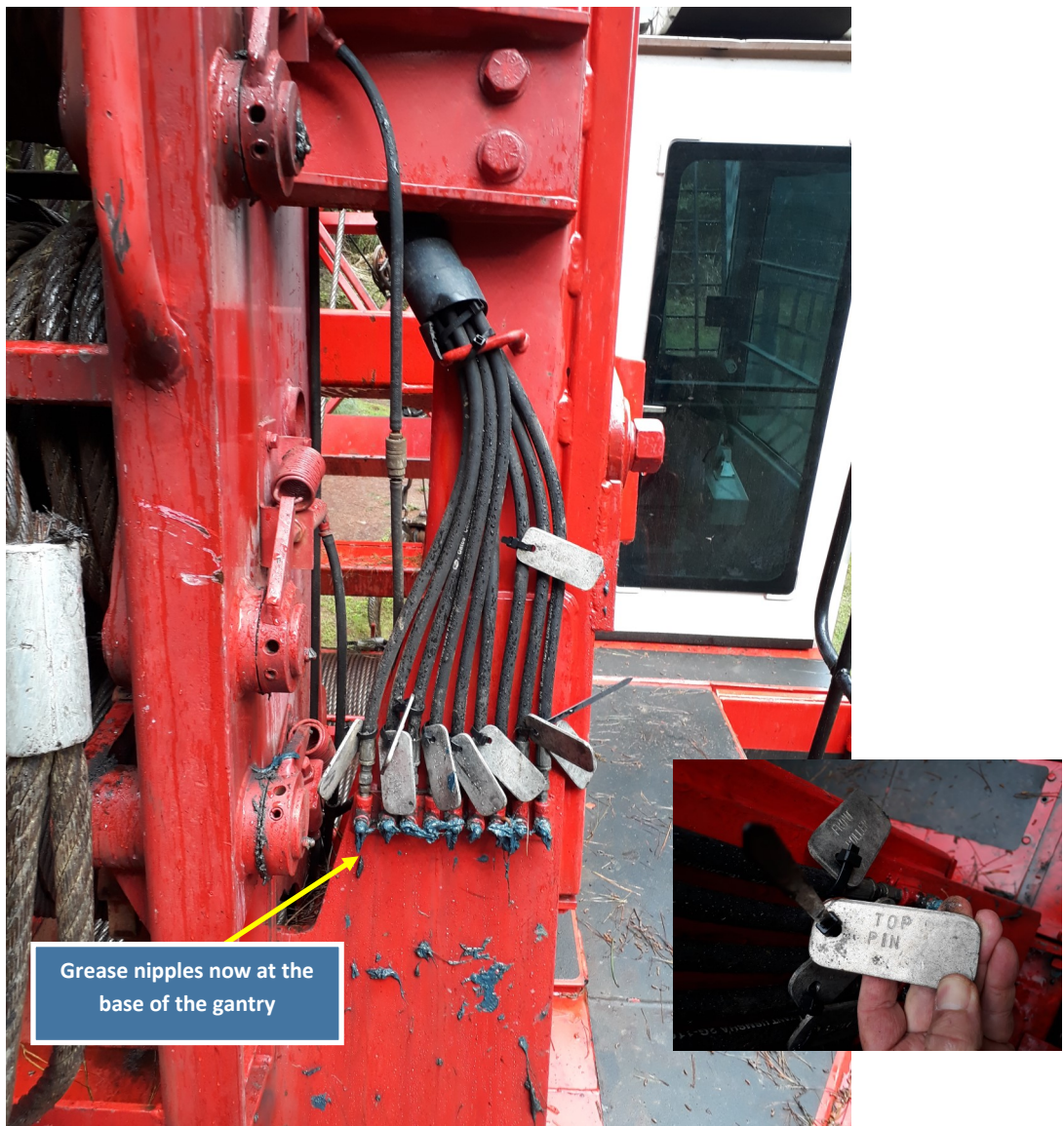


Eliminating the use of the gantry ladder

In the past, common practice was to use the gantry ladder to get to the top fairlead to grease the components. Danny and Steve modified this, to allow for greasing to take place from the base of the hauler. It is no longer necessary to expose people to the risk of climbing up the ladder and performing maintenance at the top of the gantry.

They achieved this by;

- Installing a hydraulic hose from each component, at the top, leading down to the base. The grease nipples at the bottom are marked to correspond with each component at the top. Using a simple hand grease gun is sufficient once the system is primed.
- A person can now stand with their feet firmly placed on the hauler deck and grease the components at the top of the gantry. There is no need for a harness and the potential to fall from height has been removed.





Cab protection improvements

A few years ago, a head snapped off and a large piece of wood fell in between the original cab guard and the front window. It smashed the window and had the potential to cause serious harm to the operator.

Danny and Steve modified the original cab guard design, to now include 180° protection for the operator.



Planned improvements

Steve is currently working on some additional modifications to ensure that the risk of falling from the hauler is totally eliminated. The designs are currently with engineers and once the modifications have been made, we will release a leaflet describing the improvements.

Unintended Consequences

When innovating to eliminate or reduce risk it is important to take the time to understand if there could be any unintended consequences associated with the change. This might include ensuring workers, who operate or interact with the modified plant, fully understand how it is intended to be operated and how it is to be maintained in the event of a breakdown. Such instruction should be recorded in your work procedures for the benefit of current and future operators.

Cost / Benefit Analysis

The cost of modifications to date were:

Modification	Estimated Cost
New handrails, guard rails and anti -slip adhesive installation	\$ 3,000
Modification of greasing system to the top of the gantry	\$ 4,000
Modification of cab guarding and installing drum camera	\$ 14,000
Total	\$ 21,000

The cost of a serious accident could far exceed the cost of these modifications. Especially when you factor in lost revenue, and potential legal fees . Needless to say the human cost of injury, permanent disability or death is unmeasurable.

Under the HSaW Act 2015, prosecution is now a real cost. Below are 3 recent examples where people sustained injuries and the company involved was prosecuted. These incidents were selected due to the nature of injury being consistent with the type of injuries that could occur when falling from height. The first two cases were charged under the Health and Safety in Employment Act 1992 , the last case was charged under the new Health and Safety at Work Act 2015.

Date	Industry	Description	Fine Imposed	Reparation	Total Cost
Aug 2016	Forestry	Operator rolled dozer 65m down a hill. Suffered a fractured back and hip.	\$31,000	\$36,910	\$67,910
Sep 2015	Construction	Person fell from a ladder and fractured both arms.	\$45,000	\$ 20,000	\$65,000
Oct 2017	Manufacturing	Person fell 2.5m through ceiling to the ground. Fractured arm, shoulder, collarbone and pelvis.	\$157,500	\$20,000	\$177,500