



<b>Date of Incident:</b>	03/12/2019	<b>Time of Incident:</b>	8:30 AM
<b>Region</b>	Auckland	<b>Business Unit:</b>	HSNZ
<b>Event Type:</b>	Serious Injury - Amputation	<b>Incident Number:</b>	-
<b>Actual Consequence:</b>	Significant	<b>Potential Consequence:</b>	Catastrophic

<b>Incident Short Description:</b>	Leg entrapment and partial amputation in a Komatsu Hoe Rotor.
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## Incident Summary:

After completing a stabilising run of approximately 180 meters, the operator returned the Hoe to the park-up area. Once in the park-up area, the operator raised the rotor and hood and, with the rotor and hood elevated, approached the powered turning rotor and kicked at some dirt on the lower skid to clear debris from the skid.

His foot missed the skid and was caught by the turning rotor causing his leg to become trapped in the rotor and amputated at the knee.

## Incident Photos:



**Void worker's foot and leg entered.**

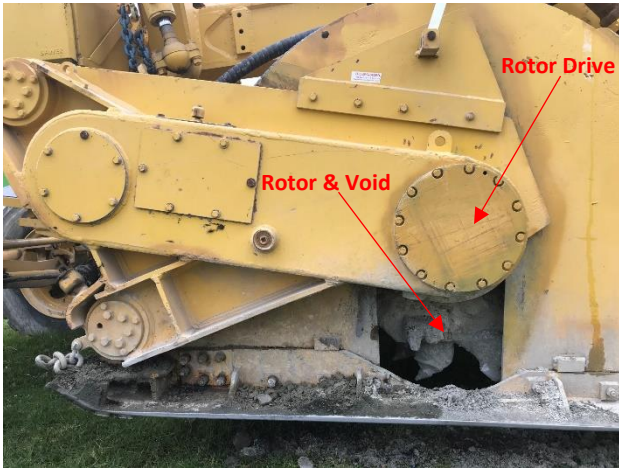
**Skid**

The picture shows the rotor in the raised position approximately 150mm off the ground. The opening created by the raised rotor drive mechanism is there to allow the rotor drive to enter the exposed space and penetrate the ground below the level of the skid.

**Komatsu GS 360 Stabilizer**



## Operation of the Rotor:



Rotor Drive

Void closed

### Rotor position when not running

The stabilizer is parked and not running the rotor hood assembly, the rotor and rotor drive are placed in the up position. The rotor is stationary and not turning at this time. When assessed during a risk assessment the rotor was stationary and as it not turning does not expose anyone to entanglement or entrapment.

### Rotor position when running

When in operation the rotor drive and the rotor itself descend down into the soil and in doing so close the open void that was visible when stationary. When operating, there are other works near the rotor as it typically is used to carry out road stabilization work adjacent to a live traffic lane.



Void behind guard

### Before

The rotor housing has a void below the rotor drive assembly that allows the rotor drive to move into as the rotor cuts down vertically into the soil below.

### After

The void is covered by a guard that prevents access to the void while still allowing for normal operation.



## Lessons Learnt:

This incident is a reminder that before any work is carried out on a rotor or any moving or rotating part of our plant and equipment, the plant must be shut down, isolated, and made safe.

- A thorough risk assessment should be completed on all plant and equipment in accordance with AS4024 and published Machinery Guidelines to ensure appropriate engineering controls are applied.
- Operators must ensure that the stabilizer is shut down and isolated before carrying out any cleaning, maintenance or inspection work on any moving or rotating parts.
- Under no circumstances is any person to approach or operate a stabilizer that exposes anyone to an energised rotor that is being powered by a motor or electromechanical device or motor.

## Improvements Made:



### Installation of a Manual Crank to turn the rotor over

The Hiways Engineering workshop designed and fabricated a keyway so that a crank handle can be inserted into the rotor drive to manually turn the rotor over during inspection and maintenance thus eliminating the need for the rotor to be turned hydraulically.



### Installation of a Hydraulic Bypass Valve

The Hiways Engineering workshop designed and installed a hydraulic bypass valve to hydraulically isolate the rotor and enable it to be more easily turned during inspection and maintenance activities.

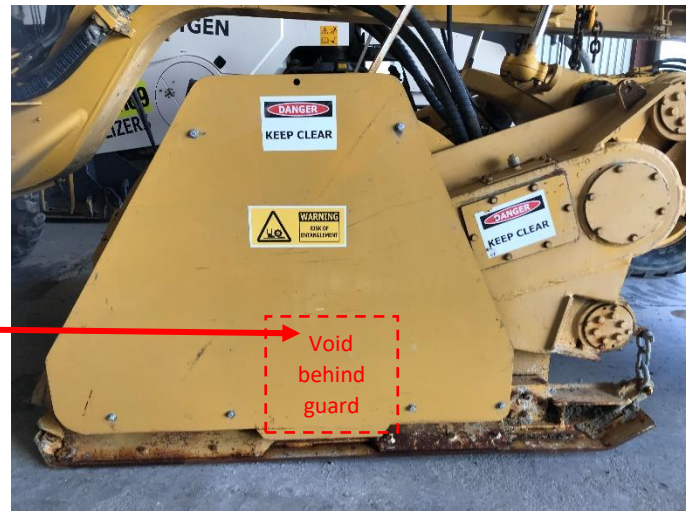


**Before**

The skids fitted to the rotor housing had a flat surface that accumulated soil during operation.

**After**

An inclined plate was fitted to the skid to limit the accumulation of soil during operation, which now slides off the angled surface and is less likely to accumulate, thereby reducing the amount of cleaning that would need to be done after the stabilizer has been operating.



**Before**

The rotor housing has a void below the rotor drive assembly that allows the rotor drive to move into as the rotor cuts down vertically.

**After**

The void is covered by a guard that prevents access to the void while still allowing for normal operation.

## Enforceable Undertaking Commitments:

In November 2021 Hiway Stabilizers entered into an enforceable undertaking with Worksafe and committed to carrying out the following activities:

- Make reparations to the injured worker, including donations to three charities identified and agreed to by the injured worker that will benefit the community.
- Engage a Virtual Reality (**VR**) developer to develop an internal training programme that uses VR to demonstrate to, and afford workers the opportunity to interact with, the Komatsu Stabiliser operated by Hiway Stabilizers in a safe learning environment.
- Engage a qualified plant assessor to complete an assessment of each of Hiway Stabilizers' different models of stabilising equipment (being the Komatsu GS360, Komatsu tracked stabiliser, Wirtgen 240, Wirtgen 2000, Landex stabiliser and the Bomag stabiliser) to identify risks posed by unguarded nip points and any other general machine safety issues. Once the relevant risks have been identified Hiway Stabilizers' will act on the report recommendations to satisfy the conditions of guarding standard AS4024 and the Machinery Guidelines.
- Hiway Stabilizers recognises that workplace roles increasingly require strong literacy, numeracy, critical thinking, problem solving, and communication skills. HSNZ will partner with an external training provider, to run a series of workplace literacy training Education sessions for workers.
- Meet with the two other New Zealand companies operating Komatsu GS360 stabilising equipment to identify (and where practicable), design and implement further safety improvements that can be made to this equipment to prevent the operation of the rotor when carrying out maintenance or cleaning activities.
- Prepare and present a session to the Auckland branch of CCNZ to share information and learnings this undertaking from the incident. Hiway Stabilizers' will separately prepare and deliver a webinar to the wider CCNZ members throughout New Zealand