Manual Task Risk Assessment

Road Saw, Turn

Cleancut 7500 compared to other machines

REV 01
12th February 2018

Introduction

Purpose and Scope

The purpose of this document is to report the manual task risk when lifting and turning a road saw. In particular, this document compares the task when operating a Cleancut 7500 compared to other machines.

Manual Task Risk

The aim of the Manual Task Risk Assessment is to describe the physical demands of manual tasks and to identify the risk of injury.

Injuries occur when the forces on a body tissue are greater than the tissue can withstand. Injuries can occur suddenly as a consequence of a single exposure to a high force or gradually, as a consequence of repeated or long duration exposure to lower levels of force. Injuries can also result from a combination of these mechanisms, for example, a tissue which has been weakened by cumulative damage may be vulnerable to sudden injury by lower forces.

As well as the forces involved, the risk of injury to different body parts such as the back, hands, shoulders and legs, is also dependent on the posture and movements involved.

The Manual Task Risk Assessment addresses each of these risk factors and the interactions between them.

Road Saws

Road saws are large, heavy mobile plant normally powered by a combustion engine and fitted with diamond saw blades of various sizes for cutting very hard objects like concrete and asphalt.

Workers using concrete cutting equipment face a wide range of hazards, such as silica dust, toxic exhaust fumes, saw kick-back, blade fracture, falling walls, electrocution, vibration, noise, slips, falls and manual task risks.

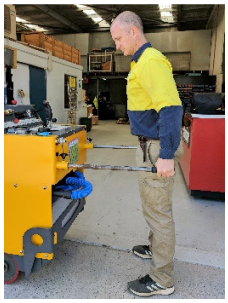
The operator walks behind the road saw when cutting. The heavy weight of these saws enables the operator to hold the blade down into the cut area giving a better and sharper cut. A straight cut is achieved through wheeling the machine along a guide indicator, such as a crayon line. The blades in a road saw are mounted to one side to enable a cut closer to a standing wall. The significant friction generated in cutting hard substances like concrete usually requires the blades to be cooled to prolong their life and reduce dust.

Turning a road saw involves applying a lifting force to the handles of the machine and walking the machine around. Operating a road saw can be very strenuous particularly when lifting and turning the machine.

Cleancut 7500

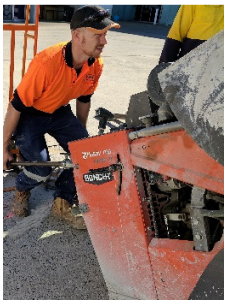
The Cleancut 7500 is a new, innovative walk behind concrete saw that incorporates a number of unique design features. The ergonomic design of the Cleancut 7500 aims to make the machine easier to use and reduce the manual task risk for the operator. The design features include:

- The centre of gravity on the Cleancut 7500 is just behind the axle of the front wheels. This balances the machine and reduces the weight to be lifted when turning the machine.
- The handles that are used to lift the Cleancut 7500 when turning the machine are 850mm above ground level which is a comfortable height for lifting. The handles do not change height with different size blades as the front of the machine pivots up and down independently. This means that there is no requirement to bend or stoop when lifting the handles to turn the machine.
- A hydraulic drive and vibration mounts greatly reduce the hand and arm vibration experienced by the operator.
- Other features such as four wheel drive and boost pressure bypass also make turning the machine easier for the operator, while infinitely variable blade speed which is controlled from the rear of the machine also add to comfort and safety of the operator while reducing blade wear.



The handles that are used to lift the Cleancut 7500 when turning the machine are placed at a comfortable height for lifting.


The handles do not change height with different size blades as the front of the machine pivots up and down independently. There is no requirement to bend or stoop when lifting the handles to turn the machine.


Other walk behind concrete cutting machines tilt to accommodate larger blades. This drops the height of the handles to below knee height and requires the operator to bend forward or stoop to lift.

Method

Objective data about the task was collected.

Forces were measured using a load cell and digital recorder.

Length and height were measured with a tape measure.

The equipment and task were photographed.

Workers were consulted and observed performing the task.

The following road saws were included in the assessment:

- Cleancut 7500 (74HP)
- Core Cut CC7074 (74.3HP)
- Core Cut CC6500 (64HP)
- Husqvarna FS6600 (66HP)
- Husqvarna FS4800 (48HP)


Cleancut 7500

Core Cut CC7074

Husqvarna FS 6600

Husqvarna FS 4800

Results

Objective Measures

Frequency

The frequency of concrete cutting will vary from day to day depending on the jobs scheduled.

For example - Road saws are often used to cut footings in to a slab which may require cutting two metre squares

The task will be assessed here at the frequency / exposure –

Task performed frequently, without many breaks or changes of task

Height

Height of handle when lifting force is applied to turn the machine.

The handles on the Cleancut 7500 are 850mm above ground level and do not change height with different size blades as the front of the machine pivots up and down independently.

Other walk behind concrete cutting machines tilt to accommodate larger blades. This drops the height of the handles to below knee.

Length

Length of handles - to where operator grips the handles.

The handles provide a lever arm to lift the machine.

Weight

Lifting force applied to handles to turn machine.

Make & Model	Height (Low/Mid/Max)	Length (mm)	Weight (kg)
Cleancut 7500	850mm Handles do not change height	600	40.0
Core Cut CC7074	Low Mid Max	600 600 600	70.0 103.8 134.4
Core Cut CC6500	Low Mid Max Low Mid Max	400 400 400 600 600 600	72.2 106.3 121.6 56.9 82.4 104.0
Husqvarna FS6600	Low Mid Max	600 600 600	69.9 93.8 115.0
Husqvarna FS4800	Low Mid Max	600 600 600	64.7 92.6 96.2

Posture and Movement

Subtask	Posture	Movement	Force (kg)
Cleancut 7500 Lift handles to turn machine	**Walk** Even / Uneven **Wrist Hands & Fingers** Grasp / Hold	**Bench** Lift **Carry** Bilateral	**40** **40**
Other road saws Lift handles to turn machine Low / Mid / Max	**Back** Bend forward Twist **Stoop** **Squat** **Walk** Even / Uneven **Wrist Hands & Fingers** Grasp / Hold	**Below knee** Lift **Bench** Lift **Carry** Bilateral	**56.9 – 134.4 - see Data**

Definitions

Posture	
Back Bend forward / lean back Bend to the side/ twist **Neck** Head down / look up / turn head **Shoulder** Reach overhead / reach forward Reach to the side / reach behind **Wrist, Hand & Fingers** Pinch / grasp / hold **Legs & Feet** Squat / kneel / foot pedal	**Sit** Supported/unsupported **Stand** **Balance** **Walk** Even / uneven ground **Climb** Stairs / ladder **Crawl** **Stoop**

Movement	
Below knee 0-600mm **Bench** 600 – 1,200mm **Shoulder** 1,200 – 1,500mm **Above Shoulder** 1,500mm – 1,800mm	**Lift** **Push / Pull** **Turn** **Carry** Bilateral Unilateral

Manual Task Risk Assessment

Cleancut 7500

	Exertion	Exposure	Posture	Movement	Vibration	Acute Injury Risk	Cumulative Injury Risk
Back	4	4	1	2	0	**No**	**Moderate**
Hand & Arms	4	4	1	2	1	**No**	**Moderate**
Shoulders	4	4	1	2	0	**No**	**Moderate**
Legs	2	4	1	2	0	**No**	**Moderate**

Other walk behind concrete cutting machines

	Exertion	Exposure	Posture	Movement	Vibration	Acute Injury Risk	Cumulative Injury Risk
Back	8	4	4	2	0	**Yes**	**High**
Hand & Arms	8	4	2	2	2	**Yes**	**High**
Shoulders	8	4	2	2	1	**Yes**	**High**
Legs	8	4	4	2	0	**Yes**	**High**

Task Characteristic				
Score	**Exertion**	**Exposure**	**Posture**	**Movement**
+1	Low force & speed	Task performed infrequently for short periods	Comfortable postures within a normal range about neutral	Dynamic and varied movement patterns
+2	Moderate force or speed, but well within capability	Task performed regularly, but with many breaks or changes of task	Uncomfortable postures, but not approaching an extreme range of motion	Little or no movement, or repeated similar movements
+4	High force or speed, but not close to maximum	Task performed frequently, without many breaks or changes of task	Postures approaching or at an extreme range of motion	Repeated identical movement patterns
+8	Force or speed close to maximum	Task performed continuously for the majority of the shift		

Environmental Characteristics	
Temperature and Stress	
Moderate heat	+1
Extreme heat	+2
Stress, lack of control or time pressure	+1
Whole Body Vibration	
Moderate	+1
High	+2
Hand / Arm Vibration	
Moderate	+1
High	+2

Injury Risk
Acute Injury Risk
Exertion score = 8, or
Exertion plus Posture >6
Cumulative Injury Risk
Sum of Task scores and Environmental Scores
<8 Low
8-15 Moderate
>15 High

Discussion

Manual Task Risk

Turning a road saw involves applying a lifting force to the handles of the machine and walking the machine around.

The Cleancut 7500 requires the operator to lift 40kg while other road saws require the operator to lift more than 100kg (56.9kg – 134.4kg) when turning the machine. Furthermore, other road saws require the operator to bend forward or stoop when the large blade is installed.

Hand and arm vibration is an important task characteristic that contributes to injury risk. The hydraulic drive and vibration mounts on the Cleancut 7500 greatly reduce hand and arm vibration.

The Manual Task Risk Assessment found that there was no Acute Injury Risk and only Moderate Cumulative Injury Risk when turning the Cleancut 7500 while there was both Acute Injury Risk and High Cumulative Injury Risk using other machines.

Workplace Safety Law

It is a shared societal value, enshrined in law, that workers should be protected from harm.

The Regulations place specific duties on employers to identify and control any risks associated with hazardous manual tasks.

This obligation is also imposed on those who design, manufacture, import or supply plant and equipment.

Workers using concrete cutting equipment face a wide range of hazards. To address this, some Regulators have developed a Code of Practice to provide practical guidance to the construction industry.

In order to protect workers and meet the duties of the workplace safety laws, further practical guidance should be developed which specifically addresses controlling the risk of injury when lifting and turning road saws.

Conclusion

Operating a road saw can be very strenuous particularly when lifting and turning the machine.

The Manual Task Risk Assessment found that there was no Acute Injury Risk when turning the Cleancut 7500 while there was both Acute Injury Risk and High Cumulative Injury Risk using other machines.

Further practical guidance should be developed which specifically addresses controlling the risk of injury when lifting and turning road saws.

References

Government of Western Australia, Department of Commerce, Commission for Occupational Safety and Health (2010) Code of practice - Concrete and masonry cutting and drilling

WorkSafe Victoria (2010) Industry standard - Safe concrete cutting and drilling Edition No. 2

About the Author

This document was produced by Grant Tracy of Better Safe Pty Ltd.

Grant has 25 years' experience in occupational health & safety. He holds a Master of Applied Science in Occupational Health and Safety as well as Bachelor qualifications in biomechanics and work physiology.

Grant has contributed to the drafting of several Codes of Practice and Australian Standards relating to safety and has presented and been published at a number of health and safety conferences in Australia and internationally.

He has special interest in is manual task risk and ergonomics.