HAZARD and RISK ASSESSMENT	TOYOTA (SSL) SKID STEER LOADER 4 SERIES			
TOYOTA MANTARIAL HANDLING	**Revision 6**	**Review Date 1 April 2018**	**Authorised S. Palmer**	**Page 1 of 9**

Description: **Toyota 4 Series Skid Steer Loader. 4SDK4, 4SDK5, 4SDK8 and 4SDK10.**

Material Structure: A steel framed, internal combustion powered / hydraulic boom arm which allows the driver to sit within an operator compartment and protected overhead by a fixed guard.

Design Feature / Utilisation	Assessment Comments	Major Hazard/s	Risk Rating:
Attachments Standard Bucket and 4 in 1 Bucket	▪ Toyota SSL are rated with a standard dirt bucket. The rated operating capacity (ROC) with the standard bucket varies depending on the model. When a non-standard 4 in 1 bucket is attached, the safe maximum rated operating capacity would need to be determined. Below is a guide on rated operating capacity of a 4 in 1 bucket. Note this will need to be confirmed as the weight of 4 in 1 buckets varies between different manufacturers. Typical weights of buckets and estimated rated operating capacity. Model — Standard Dirt Bucket — 4 in 1 Bucket — Estimated ROC with 4 in 1 4SDK4 — 60kg — 150kg — 230kg 4SDK5 — 80kg — 200kg — 310kg 4SDK8 — 115kg — 270kg — 495kg 4SDK10 — 155kg — 295kg — 680kg ▪ Operator's/owner's to conduct further risk assessment specific to their circumstances (e.g. attachment used, application and work environment). ▪ The bucket is attached and released manually by inserting/removing a pin between the bucket and boom arm. Caution needs to be taken to ensure the pin is correctly in place prior to operation to prevent the bucket falling off during operation causing numerous hazards. ▪ When a Tine attachment is fitted and utilised with an SSL it must comply with the relevant Forklift standards. Such use is outside of the scope of this assessment. ▪ Additional mesh on the rear of the bucket is an option available to reduce the possibility of the load falling onto the cabin during maximum lift of the boom arm.	▪ **Tipping** by overloading SSL with bucket & load. ▪ **Attachment failure** due to misuse or mismatch with SSL model. ▪ **Rolling** due to overloading or misuse of SSL. ▪ **Crush hazard** from bucket/load falling – if not correctly attached.	▪ High ▪ High ▪ Extreme ▪ Extreme

Design Feature / Utilisation	Assessment Comments	Major Hazard/s	Risk Rating:
Noise	▪ A formal noise assessment was outside the scope of this assessment, however sustained and intermittent noise emissions can be an issue. Personal protective equipment such as earplugs and earmuffs would assist in protecting Operators. ▪ Some models come with an enclosed air-conditioned cabin which can reduce engine and external noise into the cabin. However, the Operator must increase awareness of external hazards during operation such as vehicles and other people.	▪ **Hearing injury** from prolonged, high volume noise exposure. ▪ **Collision hazard** if Operator not aware of approaching vehicles or people. ▪ **Crush hazard** to people if cannot be seen or heard by SSL Operator.	▪ High ▪ High ▪ High
Seating	▪ The seat in all of the SSL models adjusts back and forward to adjust the operating leg space and access to the foot pedals. There is no back tilt adjustment. Long hours of use without stretch breaks is not recommended. ▪ The standard seats do not have suspension, but an after market suspension seat (forklift type) can be fitted to the larger SSL models, that is 4SDK8 and 4SDK10. This assists to reduce the shock through the seat.	▪ **Back injury** due to jarring from SSL motion. ▪ **Back injury** due to prolonged work with poor back support.	▪ Moderate ▪ Moderate
Ergonomics	▪ Moderate push / pull force is required to operate driving levers due to dampeners that reduce vibration. ▪ The cabin hydraulics take some of the weight of the cabin on the 4SDK5 and 4SDK8 whilst it is being lifted, requiring a moderate force. However, on lowering the cabin, gravity causes it to close quickly with force causing a possible crush hazard.	▪ **Crush hazard** ▪ **Manual handling** hazard related to prolonged, repetitive use of driving levers.	▪ High ▪ Low
Vibration	▪ Constant vibration is experienced by the SSL Operator during use through the seat and the steering levers. ▪ The 4SDK models have vibration dampeners on the steering levers reducing the degree of vibration. ▪ Use of personal protective equipment in the way of gloves will assist to reduce the vibration to the Operator.	▪ **Manual handling** hazard related to prolonged, repetitive use of vibrating driving levers.	▪ Moderate

Design Feature / Utilisation	Assessment Comments	Major Hazard/s	Risk Rating:
Access/Egress for operation	▪ All Toyota SSL models are accessed by the Operator from the front of the machine over the bucket attachment, requiring 3 steps up into the cabin. There are grip handles on both sides of the cabin to assist entry and exit and these should be used at all times when entering and exiting the SSL. ▪ Conversely the SSL machines are egressed in reverse, with the Operator turning around within the cabin and stepping backwards down over the bucket attachment. ▪ The Operator's Manual and Video indicate not to access or egress the machine whilst the boom arm is raised. ▪ Should there be a mechanical failure and the machine needs to be exited whilst the bar is up there are 2 pins (4SDK4 has one pin) that must be inserted from within the cabin to help prevent the boom arm from lowering. ▪ The location of hydraulic pipes to the bucket attachment in Model 4SDK4 and 4SDK5 poses a trip hazard during access/egress to the cabin. ▪ A rear window is an option for all models and if present, is equipped with a quick release safety pull for emergency access/egress.	▪ **Slip hazard** ▪ **Fall hazard** ▪ **Crush hazard** due to falling boom/bucket/ load.	▪ Moderate ▪ Moderate ▪ Extreme
Access/Egress for maintenance	▪ In SSL models 4SDK5 and 4SDK8 the cabin tilts up and latches back to allow engine access. ▪ In SSL models 4SDK4 and 4SDK10 the seat tilts up and latches back to allow access to the engine and hydraulics. Engine maintenance in these models is conducted in more confined space requiring sustained awkward postures. ▪ In all models the radiator and oil cooler can be accessed from a rear swing out door. The door is weighted for overall machine stability and has a pull out latch to prevent it from closing accidentally on the Operator. ▪ The radiator and oil cooler become hot during operation and may pose a burn hazard.	▪ **Burn, amputation, laceration, crush or impingement hazard** if body parts caught in engine / fan during access. ▪ **Crush hazard** due to rear door crushing. ▪ **Burn hazard** from radiator / oil cooler. ▪ **Crush hazard** due to failure of jacking system.	▪ High ▪ Low ▪ Moderate ▪ Extreme

Design Feature / Utilisation	Assessment Comments	Major Hazard/s	Risk Rating:
Access/Egress for maintenance continued	▪ In 4SDK10 the fan is more exposed than other models causing an increased hazard of laceration and amputation. Toyota specifies not to operate the vehicle when the rear grill is left open. ▪ To raise the vehicle, a suitable jack and stand is required.	▪ **Tipping hazard** if cabin tilted up without bucket attachment. ▪ **Crush hazard** due to cabin falling if not secured. ▪ **Manual handling** from awkward postures due to restricted engine access.	▪ High ▪ High ▪ Moderate
Lighting	▪ The SSL are fitted with standard: illuminated panel, front and rear lights and full road lighting kit.		
Visibility	▪ Operators need to be aware that “blind spots” do exist and take appropriate precautions. ▪ All Toyota SSL models are fitted with a reverse alarm and reverse lights.	▪ **Crush or collision hazard**	▪ High
Control Panel Design	▪ The Control Panel is situated in front and overhead of the cabin seat. It is in easy view and reach of the Operator and contains a number of clearly indicated warning lights.		
Temperature	▪ Some models have the option of an enclosed, air-conditioned or heated cabin, so the temperature is adjustable and controlled.		
Ventilation emissions	▪ The Toyota Operator’s manual specifies that the SSL should not be started in a poorly ventilated area. Adequate ventilation is required during operation. ▪ Some models have the option of an enclosed, air-conditioned cabin, which can reduce dust and engine emissions from entering the Operators cabin. ▪ Toyota provide an option of fitting an exhaust filter to reduce the toxicity of exhaust emissions. ▪ The risk posed by emissions is dependent on the workspace, degree of ventilation and exhaust extraction system operating within the space. Specific risk assessment of each environment is required.	▪ **Toxicity and breathing hazard** in certain work environments due to prolonged inhalation of dust and other particles and possible toxins. Also exhaust emissions if operated in an enclosed space.	▪ High

Design Feature / Utilisation	Assessment Comments	Major Hazard/s	Risk Rating:
Machine rolling / tipping	▪ The features of the SSL in combination with environmental factors such as ground gradient can put the SSL at risk of roll-over and tipping. ▪ Do not use the SSL machines on "steep slopes". The Warranty and Video indicate that "extra care" should be observed when using the Industrial Equipment on slopes, in wet weather or on wet or slippery surfaces. Seatbelts are standard on all models. ▪ Personal protective equipment in the way of hard hats may assist in protecting the Operator during roll-overs or tipping.	▪ **Roll-over and tipping hazard** 4SDK4 at extra risk of roll-over and tipping due to wheel base to height dimensions.	▪ Extreme
Engine	▪ Low gear ▪ Maximum speed for the SSL machines ranges between 9-11 km/hr ▪ The engine automatically shuts down when the hydraulic oil temperature goes beyond 90°C.		
Warning Signs	▪ There are numerous warning and operating stickers within the SSL cabin. These are a general guide and all Operators should refer to the Operator's Manual and Video for detailed information on safe operation.	All hazards associated with misuse of the SSL and attachments. Refer to other relevant sections for comments.	
Fire / Burn	▪ Since the SSL engines are diesel (there is no petrol option) this assists with reducing the fire hazard. ▪ Hydraulic systems drive the bucket and the transmission. The hydraulic pressure is 11-13.7 mpa (1600-2000 psi), whilst the hydrostatic pressure runs at 27.6 mpa (4000psi). Hydraulic leaking could cause serious burn injuries. ▪ Operators to check hose conditions prior to all operation.	▪ **Burn hazard** from fire and hydraulic system failure.	▪ Moderate

Design Feature / Utilisation	Assessment Comments	Major Hazard/s	Risk Rating:
Safety Features ▪ Pedal lock ▪ Seat lock: 30 kg to activate ▪ Safety bar ▪ Safety belt lock ▪ Reverse lights ▪ Reverse alarm ▪ ROPS ▪ FOPS ▪ Raised apron ▪ Coloured warning lights on operation panel ▪ horn	▪ There is a range of safety features aimed at preventing the machine from being used without an Operator in the cabin and securely seated. ▪ When the safety bar is raised it engages a mechanical handbrake and pedal lock preventing the SSL from being operated. Note: The mechanical handbrake is not fitted to 4SDK4 and 4SDK10. Handbrake must be applied manually by the operator. ▪ Also, the seat must have a continuous minimum weight of 30kg (2-3 second delay) in order for it to activate the solenoid which unlocks the pedals and allows hydraulic operation. ▪ Seatbelts are fitted as standard. ▪ The Toyota SSL machines include roll-over protective structures (ROPS) and falling object protective structures (FOPS) which are tested to the relevant ISO standard 3471 and 3449. ▪ Toyota has raised the apron of the cabin in order to help prevent Operator's from using the SSL with their legs exposed from the cabin. **Note:** ▪ Always apply the parking brake when exiting the SSL. ▪ Always remove the key from the ignition to stop unauthorised operation when exiting the SSL.	▪ **Crush hazard** if boom / load / bucket fell.	▪ High
Maintenance	▪ Toyota Dealers provide repair and maintenance service. ▪ Toyota's recommended maintenance schedule, based on hours of service, is specified within the Operator's Manual and Warranty for each model and includes information on periodic parts replacement and pre-operational check. ▪ Pre-Operational checks are demonstrated and discussed in the Toyota Skid Steer Safety Video. ▪ Daily cleaning after operating in harsh conditions.	▪ **Numerous hazards** related to failure of FOPS & ROPS & other safety systems if they are modified.	▪ High

Design Feature / Utilisation	Assessment Comments	Major Hazard/s	Risk Rating:
Hazard to others	▪ Exposed moving parts such as the boom arm, attachments and load may place others at risk. ▪ Ensure others are clear of the SSL during operation at all times.	▪ **Crush or collision hazard**	▪ High
Environmental conditions	▪ Operators are advised to take extra care when operating SSL's near power lines, near people or with corrosive or dangerous loads. ▪ All Operators need to comply with statutory requirements for operation of this category of plant**.**	▪ **Collision hazard** if used on public roads or in low light conditions. ▪ **Roll-over and tipping hazard** if used in inappropriate conditions. ▪ **Fire/Electrocution hazard**	▪ Extreme ▪ High ▪ Extreme
Misuse / fluctuating operating conditions	• SSL is not to be operated on excessive gradients. For all other conditions, the Operator must assess the immediate work environment prior to operation. • Operators to refer to the Manual for ascending and descending guidelines	▪ **Collision hazard** if used on public roads or in low light conditions. ▪ **Roll-over and tipping hazard** if used in inappropriate conditions.	▪ Extreme ▪ High
Competency of Operators & Training	▪ SSL Operator licencing requirements vary in each state. Refer to state regulatory body to ensure Operators comply with relevant legislation for licensing, competency skills, assessment and training. ▪ Initial induction is available through the Dealer. Additional training may be available through external providers	▪ **Collision hazard** ▪ **Roll-over and tipping hazard.** Various hazards resulting from misuse/inappropriate use of SSL and attachments due to insufficient safety and operational training.	▪ High ▪ High

Design Feature / Utilisation	Assessment Comments	Major Hazard/s	Risk Rating:
Documentation and Provision of information	▪ The Operator's Manual, Video and Warranty are available in English ▪ Ensure operators have read and understood the Operators Manual.	Various hazards resulting from misuse / inappropriate use of SSL & attachments due to insufficient safety & operation information.	
Operators Video	▪ The Operator's Video outlines general hazards related to SSL operation and advises that the Operator is required to conduct further hazard identification related to their own circumstances, application and working environment. The Video also provides the following information: ▪ Pre-operation check. ▪ Maintenance schedule (as indicated in the Operator's Manual) with annual service by Toyota Dealer. ▪ 650kg safe working load (4SDK8) – this is only accurate for the Standard Bucket attachment (115kg). Most other attachments weigh well in excess of 100kg and therefore reducing the safe rated operating capacity. ▪ Outlines safety features including to always wear the seat belt. ▪ Demonstrates possible tip hazards on slopes. ▪ Outlines the requirement for appropriate Operator's License. ▪ Indicates the overhead guard is not to be modified. ▪ Advises to raise SSL on the correct capacity jack. ▪ Never place body parts underneath the SSL. (However this cannot be avoided where access is required underneath the SSL during maintenance/repair for which an appropriate jack and stand is recommended). ▪ Highlights dangers to others. ▪ Caution the Operator to keep within the Manufacturer's instructions with regards to slopes. ▪ Clearance heights required from electricity poles. ▪ Advice to check headlights prior to use at night.	Various hazards resulting from misuse / inappropriate use of SSL & attachments due to insufficient safety & operation information.	

Review of documentation:

Toyota Operator's Manual 4SDK3, 4

Toyota Operator's Manual 4SDK5, 6, 8

Toyota Operator's Manual 4SDK10

Toyota Industrial Equipment Warranty and Conditions

Toyota Industrial Equipment Repair Manual Models 4SDK3, 4, 5, 6, 8, 10

Toyota Industrial Equipment Parts Catalogue

Marketing Material for 4SDK

Application for Toyota Skid Steer Loader

Toyota Skid Steer Safety Video

References

Standards Australia, AS/NZS 4801:2001 *Occupational health and safety management systems – Specification with guidance for use.*

Standards Australia, AS2664:1983 *Earthmoving machinery – Seat belts and seat belt anchorages.*

Standards Australia, AS2294.2:1997 and AS2294.3:1997 *Earthmoving machinery protective structures – Part 2 & 3 Laboratory tests and performance requirements for roll-over and falling-object protective structures.* Standards Australia, Sydney.

National Occupational Health & Safety Commission: National Standard for Plant [NOHSC: 1010(1994)]

Standards Australia, AS/NZS4360 *Risk Management.*

NSW Occupational Health and Safety Regulation 2001, WorkCover NSW 2001.