

Tiltip Operation Procedures

If corporate activities involved earthworks, infrastructure maintenance, civil or government projects you are likely to utilise tip trucks, along with various ancillary equipment; bob cats, excavators, ride on mowers and line markers, water carts, bulk bins, lighting plants and other on-site equipment such as site office and shipping containers as part of daily operations which need to be located on and off site

This unique Australian Patented Transport Initiative evolved as a result of a bob cat accident involving tip trucks and portable ramps, and now incorporates “Duty of Care” & “World Best Practice” principals, providing Dual Function 48 deg tipper / 14 deg tilt tray, one cab chassis, one set of hydraulics, no weight penalties, whilst enhancing labour and equipment utilization and addressing well known OH&S issues associated with positioning equipment

The operator is provided with a safe & accessible workplace to conduct the normal load / discharge, start-up / shut-down & load restraint procedures with confidence and more efficiently. Traction lugs assist vehicle manoeuvring during load / discharge activities; whilst retractable in-body load restraint rings assist the operator to secure equipment, and Tiltip provides a three points of contact access steps as a standard fitting

Tiltip is compatible with OEM conventional and or crew cab 4x2, 6x4, or 8x4 twin steer cab chassis. Tray length range from 4.5 Meters on a 7.5 ton GVM cab chassis; progressing through to 7.5 Meters on the larger 6x4 & 8x4 twin steer rigid vehicles, catering for payloads ranging between 3, 4, 6, 8, 10, & 12 ton

Optional Accessories include: drop-side with removable support posts, electric or hydraulic winches & battery isolating switch, towbar & pintle along with client nominated trailer connections, rollout load covers, tool box, 25 litre water tank, LED lighting, hand held remote controls etc

Fleet Managers have the option to select cab chassis with conventional leaf spring or rear axle airbag suspension which provides two advantages

1. Inflate airbags when extending the Tiltip Tray on uneven surface conditions
2. Deflating airbags once extended will reduce load angle by approximately 1.5 deg over conventional leaf spring Tiltip Combinations when in Tilt Mode

Tiltip market Include; local & state government, forestry, earth contracting, landscaping, main roads, rail infrastructure support, telecommunications, mining, exploration, national defence, development & construction

Operation Benefits Include; Safety, reduction in operating expense, ease of operator and equipment access, ability to incorporate a proactive OH&S workplace initiatives, improved labour and equipment utilization, which logically should lead to overall fleet size reduction

On our web site www.tiltip.com under OH&S there are several OH&S articles on Tipping / Tilt Tray operations including a Western Australian WorkSafe Bulletin on Tilt Trays which Tilt Industries recommend as essential reading for Operators and Drivers

Driver Operator Tutorial

4. **Driver endorsement:** There is only one additional selection control switch over and above traditional tipper controls the driver / operator must understand; The Dual Function Tip / Tilt Mode Selection Switch,

Note; the Tip / Tilt Selection Switch can only be activated as & when the Tiltip body is in the horizontal / neutral position and the tray is down in hard contact with the sub frame to complete the micro circuit breaker connection required for function change

This is a safety feature to prevent accidental activation and function change partway through any operation. Should the dashboard selection switch be accidentally activated during tipping or tilt operations it will not alter the vehicle's current activity until the tray has returned to the neutral horizontal position and compressed the chassis mounted micro switch

Note; operator pressure must be maintained on the "up – down & in- out" control button otherwise the hydraulics will immediately lock preventing further tray movement, until pressure is reapplied to either the cabin dash controls or remote button to complete selected activity

Note; as the operator activates the tray function selection switch ie. Going from "Tip to Tilt" there is a moment delay then an audible confirmation of the pneumatics activating the systems release and locking mechanisms associated with the lifting arms and pivot points, once heard the operator can then elevate or extend the tray as required

It is important for the operator to listen for that audio confirmation prior to activating the "up – down, or In – out" controls; As it is confirmation there was sufficient air reserves to complete the release and locking of several key Tiltip functions

However In the event of Hydraulic and or Pneumatic Failure, Safety Fuse Valves have been fitted [similar to those required for the crane industry] as a standard safety precaution on all Tiltip Bodies

Optional Safety Feature; Service Props are available and if required should be included in the client build specifications at the time of ordering

Note; Tiltip Hydraulics power all tray movements, damage would result if service safety props were not removed prior to selecting and activating the "Down" function

Let us begin with the cabin controls;

The operator will be confronted with a familiar dashboard control layout;

1. PTO
2. Tip – Tilt Selection Switch; One addition control the operator needs to understand is the “Tilt or Tip” Function Selection Rocker Switch. [Which can only be activated when the tray body is in the neutral horizontal position; ie. Tray in down position and touching the sub frame to activate the electrical circuit required to change operation functions]
3. The “Up – Down” in Tipper Mode and or “In – out” in Tilt Mode rocker control switch. The one switch services both activities
Note; switch button pressure must be maintained to continue selected function, release pressure, immediately the activity will stop & the tray will remain & stay in that position until pressure is reapplied]
4. Tail Gate Switch: Pneumatic Activated Tail Gate Release / Cam Fastener
5. OEM Optional Cab Chassis Rear Airbag Suspension; Factory or Dealer Fitted Airbag Suspension; Air Bag Inflation / Deflation will be activated by dash mounted OEM controls

All Selection switches are located in easy reach and visible to the driver whether he / she are in or outside the cabin.

Note; Optional Remote Hand Held Operator Controls Are Available; Hand Held Remote controls for the Tiltip Tray “Up – Down & In – Out” and the “In – Out” winch operation are available but must be included in the original build specifications and purchase order

Operator Procedures

Position the Tiltip Vehicle deliberately selecting safe area to perform load / discharge activities, and follow standard Tiltip and Corporate OH&S Procedures

1. Check the hand brake is on and the vehicle transmission is in neutral
 2. Start the vehicle, depress the clutch and engage the PTO as is the normal Tip Truck driver procedure
 3. Check the system has sufficient air reserves to release the breaks and operate pneumatic system as required
- 5. Operator must assess site conditions;**
- Check the vehicle & all ancillary equipment are functioning correctly, assess site location confirming ground surface conditions are suitable for the operation about to be undertaken, look for and consider obstructions such as overhead powerlines, trees, and awnings which would impede procedures and represent a OH&S risk, consider other site activities and

personal and changing weather conditions, insure all bystanders are informed and kept at safe distance, then proceed as required

6. Once positioned, prepare the vehicle and equipment for the desired activity; detach and park any trailing equipment, release pneumatic tailgate, remove appropriate tail gate pins for anticipated operation, swing and secure the tail gate as required, secure or release load restraint as and when appropriate with caution and safety in mind regarding possible load shift

Note: Understand care must be taken when releasing load restraint especially when tray is inclined, due to possible transit load shift, gravity and sudden release of restraint tension can cause unexpected load shift which may cause injury

Make sure the correct "Tip or Tilt" function is selected ie. Pointless selecting "Tip Mode" if the operator's intention is to discharge or load ride-on equipment!

7. Once again, Check there are no obstruction behind, above or to the sides ie. Overhead electricity lines, trees, awnings etc. Check and advised all personal what is about to occur and to stand well clear, If available appoint observers, maintaining eye and hearing contact if possible, seek the "all clear" to proceed from observers and crew

Practical Tiltip Understanding

Consider your arm as the Tiltip hydraulic lifting mechanism, which can be extended straight up above your head or your fist can be returned to your shoulder halving the hydraulic mechanism extension arc

Tip Mode; with your arm extended straight above your head represents the hydraulics in tip mode

Tilt Mode; now bring your fist back to your shoulder and consider your elbow and your forearm are locked to the underside of the tray body. You are now in Tilt Mode. The Hydraulics will first lift the front of the tray and as the lifting arms pass through the fulcrum point and continue back beyond the vertical, the rear of the tray will release and slide off the chassis towards the ground

How does this operate? As you selected Tilt Mode pneumatics controlling pins in both upper hydraulic lifting arms fired locking the upper lifting arm to the underside of the tray, and at the same time releasing the travel cars located at the rear of the tray bodies longitudinal channel bearers which house the tipping / tilt pivot point. The front of the tray can now be lifted, and then driven back and out as the hydraulic swing through that restricted half arc towards the rear of the vehicle

Note; for Air Bag Rear Suspension Tilt Mode operation;

On Tray Extension; If the vehicle is fitted with rear axle air bag suspension, the operator inflates the airbag to full height prior to extending the tray.

When the tray is at its full extension then deflate the airbag to allow the rear of the tray to settle to the ground.

Airbags assists the operator overcome uneven surfaces and reduces the load access angle by approximately 1.5 degrees compared to leaf spring Tiltip configurations

Subject to ancillary equipment weight Airbag Suspension will assist preventing road and site surfaces scuffing by allowing the tray to be counter levered out supporting much of the load during tray extension.

All Tiltip Trays are fitted with rear rollers to minimise surface scuffing during tilt mode extension / recovery operations

On Recovery; After loading and securing equipment; first inflate the Air Bag Suspension prior to retrieving the tray. When the tray is in the neutral position, returning airbags to transit settings prior to departure

During extension; the front of the tray will lift and then travel back with the rear extending out beyond the chassis. The rear end will first dip, and then scallop up to the desired load angle.

This scalloping effect may bring the trailing tray edge up beyond the ground level, if so by retrieving the tray in slight recovery adjustments you will determine the best extension position to load / discharge equipment

Note; when the tray is fully extended and if the transom is above ground level, any downward pressure resulting from equipment mounting, will compress rear suspension bringing the trailing edge back in contact with the ground providing longitudinal and lateral stability during load / discharge procedures

Tip Mode Operation

In Tip Mode the reverse occurs; the top hydraulic lifting arms are released from under the tray allowing the hydraulics arms to extend vertically to their full height, at the rear the slide-cars located in the underbody lateral channel bearers are locked in position, to prevent the tray exiting the chassis, and the hydraulics can now extend upwards to 48 degrees tipping angle

In Tip Mode operation stability is enhanced through a combination of load share occurring between the twin lifting arms located outside chassis rails and in-between the front and rear axles groups, and the rear pivot point during discharge, which reduces the tendency for the tray racking and to slew to one side due to site incline or other load factors

However when tipping the Driver must remain vigilant, satisfied himself the load, its condition ie sand / clay, wet / dry, ground surface, incline and vehicles alignment, together with prevailing weather conditions are acceptable for a safe operation

If in doubt change or alter vehicle positioning or postpone operations

A walk around the vehicle will familiarize the operator with the safety features and operations procedures; Starting from the driver's cabin door and proceeding aft

1. Retractable In- Body Load Restraint Rings.

These Pop-Up Load Restraint rings are rated at 4 ton and 6 ton SWL, positioned around the tray, normally 6 – 8 depending on the tray length, known load / equipment specifications & client preferences nominated at the time of build.

Once raised they remain elevated to allow easy operator access either from ground or within the tray body

Note they stow flush with the floor; when down designed not to interfere with tipping function

2. Split Drop sides allow the operator to access the in-body retractable load restraint rings, to secure, inspection or release equipment from a ground position

Note; There is a design option to also specify removable support posts to allow the loading of shipping containers and over-width equipment

3. Tail Gate Operation

With a dual function Tipper / Tilt Tray a two way tail gate is mandatory

However there is an option of a three way tail gate for those who wish to use the tailgate as an extended entry ramp, which can be either a manual or hydraulic assisted operation

Three way tailgates are normally associated with the smaller crew cab chassis where tray length is restricted as a result of rear seating requiring larger cab design. [Note; In Tilt Mode with the three way tailgate operator does not activate the pneumatic tailgate release as with standard Tiltip procedures which is explained later]

Note; Swinging the Tailgate to the passenger's side requires clear space to accommodate the arc

If we require the tailgate to be swung back and fastened along the passenger side it is secured by the retaining latch in the following manner;

1. Activate Dash Mounted pneumatic tailgate release
2. Exit the vehicle, check that the tailgate swing arc is clear of obstructions
3. Release rear post cam lock, and swing tailgate to the passenger side and fasten

Note; When Departing Remember To Relocate the Tail Gate To Its Correct Transit Position;

When the tailgate is swung back and secured alongside the vehicle is probably over-width according to Australian Road Legislation, and when in transit there is always the possibility of something releasing the gate and if it were to swing through the closing arch it could easily cause injury or damage to third party property.

Operator Pre Departure Safety Checks must be conducted to confirm the tailgate and retractable safety steps have been returned and secured in transit position, and that all

ancillary equipment and materials are loaded and secured in accordance with state road and WorkSafe legislation, and corporate guidelines

Three way tailgate in ramp mode

The three-way tailgate is different to standard Tiltip tailgates and they require separate operating procedures. They are designed to accommodate client nominated specific equipment / weight access requirements. **They must not be overloaded**, as this could easily cause tailgate damage which would impede future operations procedures and could represent OH&S risk

The bottom edge has two “u” shaped brackets which interact with the pneumatic activated closing cams;

When the lower cams are closed and the post side pins removed those bottom cams now form the lower hinge mechanism

Note: Therefore when selecting Tilt Mode DONOT releases the Pneumatic Tail Gate Locks Operator must be aware of the tailgate weight and the need to control the tailgate during lowering procedures

Remove passenger side tailgate hinge post pins, and stow in the tool box to avoid loss

Maintain control of the tailgate, release the two top cams, then lower the top of the tailgate to the ground

You now have an extended first stage approach ramp to assist equipment access during load / discharge procedures

Tray Recovery is done in the reverse format

Secure Equipment

Lift & Return Tailgate to upright transit position & replace hinge pins and secure post cams

[If fitted] Inflate air bags

Check everyone is clear and understand the procedure which is about to occur

Retrieve the tray

Stow remotes and secure any equipment

If the winch was used [isolate the electrics if required] and stow leads and hand controls in driver's overhead locker

Carry out pre trip vehicle walk around inspection checking load positioning and restraint

Turn off PTO

4. Tiltip Traction Lugs

These are standard but optional fittings, obviously designed to assist equipment gain traction during load / discharge activities

Some clients choose not to have traction lugs as they interfere with other crew activities such as shovelling mulch. In those circumstances the operator normally utilizes the winch and snatch straps to load / discharge equipment

5. Tiltip Retractable Safety Step

Tiltip has designed a retractable operator step which angles out from the tray body to provide the operator ease of sight and feel to locate the rough profiled steps during ascent and descent

Whilst providing the driver / crew a three point of contact, two hands and foot when climbing / descending

Simply release the retention pin and slide the step from under the tray and lowered into the user position

The reverse procedure to recover and stow

Note: Avoid Over-Width Issue: Driver pre-trip checked which must form part of the procedure to insure the step is stowed in the correct position and secured prior to venturing onto Australian roads

6. Electronic Winch Operation

Note;

Care must be taken to insure the operator has control of the load with the winch cable before releasing load restraint, and that all parties are aware of the operation which is about to occur, and that everyone remains clear of winch cables and stay out of the path of the discharge at all times

The normal caution procedures related to overhead and side obstacles are necessary

During Recovery; Care must be exercised to insure whatever item is being recovered, i.e. Shipping containers do not foul the transom or other objects as winch tension will escalate rapidly, especially if using a 2 to 1 block reduction which could exceed equipment load design limitations and represent a OH&S risk

Tiltip recommends the operator stows the remote and cable controls in the driver's cabin locker for ease of access

On our web site www.tiltip.com under OH&S there are several OH&S articles on Tipping / Tilt Tray operations including a Western Australian WorkSafe Bulletin on Tilt Trays which Tilt Industries recommend as essential reading for Operators and Drivers

Note Hand Held Remote Control; If the operator / driver is using the remote "Up – Down & in - out" hand control to activate Tiltip functions there is a limited transmission / receiver distance the device is designed for and a transmission shadow directly behind the raised tray

Driver Operator should position themselves towards the rear and out slightly to one side so as to gain good visibility of prevailing conditions ie. Overhead power lines, over hanging tree limbs and awnings Etc and be able to supervise and control activities, whilst remaining within transmission range

Isolation Switch [when fitted]

We need to return to the Tiltip's driver's side to inspect the battery isolation switch, As you can see located under the tray, attached to the chassis rail we have the vehicles battery box and on top we have a red key which will isolate the electricity supplying the electronic winch

Plug-In Hand Controls

The hand held winch control has enough cord to allow the operator to stand well clear and or mount the tray to conduct the winching operation.

The procedure is to remove the winch connection dust cover from the side of the winch which is centre mounted and forward of the tray headboard, plug in the cord attachment, having turned on the power supply [if fitted with isolation switch] we are ready to winch

Note; There is a remote hand held cordless control option available

If we mount the tray you will note a removable hatch low down in the middle of the tray headboard, lift and remove and stow the cover, you now have access to the cable and hook. Release the cable by rotating the chrome handle down to the free spool position, pull out sufficient cable to attach the hook and recover the equipment, return and engage the winch by returning the chrome handle up to its engaged position. Now you are now ready to control recovery activity with either the hand held cordless or cabled unit

If the operator is using the winch remote hand held cordless control there may be a requirement to "power up" the control by depressing both of the "in & out" button at the same time and holding for 2 – 3 seconds. A light will illuminate when "powered up" and ready for use

It is important the vehicle engine is kept running at between 800 and 1000 rpm to provide adequate alternator 12 volt battery power for winching activities.

Note; Overloading or Operating Electric Winches with insufficient power will risk burnout which will not covered by warranty

2 to 1 Reduction

You also have an option to increase the winching effort, with the use of a turning block to set up a 2 to 1 recovery cable doubling the winch recovery effort.

Direct the winch cable through the turning block, attach the turning block to whatever item due to be recovered, and return the cable & hook end towards the headboard attaching it to the retractable load restraint ring positioned immediately in front of the winch panel

Again you are in the position to recover, but remain vigilant regarding smooth recovery and the possibility of the leading edge of item becoming snagged on the transom or other obstacles which is a serious OH&S risk. Should that occur the winch tension must be immediately released, and steps taken to overcome the problem to avoid a reoccurrence before recommencing recovery efforts

Obviously discharge can be accomplished through either tilt or tip mode in the reverse sequence with the operator choosing a safe and secure location to discharge his load and what winch controls to use, and that the winch is engaged with sufficient cable tension before releasing load restraint, preferably from ground level

There will be a requirement for the driver to release the winch ratchet once the equipment has come in contact with the ground and gravity will not allow further discharge without the vehicle being driven out from under the load

Drive out from under the load, release and return all equipment to transit settings

Driver Pre Trip Vehicle Check;

It is a good discipline for the driver to always walk around the vehicle and satisfy himself his vehicle is loaded correctly, items are secured, and conforms with Corporate, WorkSafe and Australian & State Road Legislation

Vehicle axle loadings and all protruding accessories are within road legislation guidelines flagged when necessary, stowed & secured according to national load restraint guidelines, tail gate in position and locked, retractable step tucked away and locked under the tray. And that there are no loose ropes or equipment which can come adrift whilst in transit
The load is secure and complies with corporate OH&S procedures and legal safety requirements, and covered as & when necessary

Recover and disconnect the hand held remote winch controls and stow in driver's locker, and isolate the winch electrics

Return to the cab, [if fitted reset airbag to transit settings] and turn off the PTO

Now you are ready to depart after collecting any trailing equipment which may have been previously parked or is due to be collected

Check site and road traffic conditions and insure all occupants are wearing seat belts prior to exiting site

Loading Tiltip Skids

Tiltip skid design incorporates a mechanical access device to assist the loading / discharge of laden / unladen skids hosting a variety of equipment and corporate apparatus such as water tanks, mounted or without fire response and spray bar capabilities, bulk waste bins, lighting and generating plants, site office, mess and ablution blocks etc.

Loading Procedure

The driver first checks the site for obstructions and conducts the normal safety assessment, Releases the tail gate and secures it alongside the vehicle dropsides, lines up the front edge of the skid and reverses his vehicle up to the skid until the apparatus wheels come in contact with the rear of the tray

The driver then dismounts and connects the winch cable and hand winch controls to apply normal winch procedures to draw the skid up so as to be able to attach trailing rear chains to load restraint rings ready to apply final tension and secure the skid

Draw skid up into a position located over forward twist locks to secured the leading edge rear chains at this time will have tensioned and aligned the skid in conjunction with forward steel floor guides

To discharge

The driver chooses the discharge location with the same site safety assessment and giving consideration to future skid recovery procedures

Releases the forward twist locks, makes sure there is ample winch cable tension to control the skid, checks all crew and onlookers are well clear and having informed them what is about to occur, elevates the tray in tilt mode allows gravity to start the winch controlled discharge procedure to a stage when the rear chains can be released, and finally the rear of the skid comes in contact with the ground and will not exit further

The Operator then releases the winch clutch to allow the winch cable to free run, returns to his cab and drives the vehicle out from under the skid and applies the park brake

Dismounts, releases and recovers the winch cable, stows all loose load restraint and any other equipment, closes and secures the tail gate, conducts the normal walk around pre-trip inspection prior to departing the site.

Before moving off reset airbags if fitted and turn off the PTO