

# TIDD Slew Safe Technical Overview

Patent Pending 741038

## Turning the Corner on Pick and Carry Crane Operator Safety

Improved operational safety was the most important criteria in the development of TRT's TIDD PC25 Pick and Carry Crane, with features such as speed limiting, speed variable steering, auto articulation deration, auto side slope deration and roll over protection system (ROPS). All safety features provided in the standard specification.

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Constant innovation is the lifeblood of TRT & Slew Safe is the latest of these developments that turns the corner on crane safety!

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## Overview

In 2013, TRT released the TIDD PC25 Pick & Carry Crane. This crane is specifically designed to include many safety features. These safety features had been requested by operators, but never seen before in this class of crane, and include;

- Auto side slope & articulation de-rating via Robway LMI eliminating the need for mental arithmetic by the operator on the job
- ROPS Cabin with FOPS option including full lap and diagonal seat belts, to ensure operator and dogman safety
- Speed variable electro hydraulic steering and speed limiting to overcome speed wobbles at high speed
- ABS brakes replacing the conventional drum brakes

A number of key operational innovations also supported these important new safety features.

- Width of 2.5m in 25t class crane, the narrowest in its class.
- Articulation to 42 degrees each side of centre for smallest turning circle and best manoeuvrability in its class.

- High tensile steel boom giving lower centre of gravity and greater lifting ability
- 1.4t roadable counterweight for heavy lifting
- Shortest forward projection in class
- Shortest wheelbase in class
- Largest storage lockers in class
- Hydro pneumatic front suspension replacing springs and pinning
- Two doors, one each for the operator and dogman
- A large comfortable cabin with ducted air conditioning & a cooler box
- Automotive quality finish

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Since the inception of articulating pick and carry cranes there hasn't been anything to stop the operator from picking up a load safely over the front on firm level ground and then driving around a corner having a slope, thereby perhaps inadvertently moving into the "red zone" (i.e. outside 100% load chart). Articulating (cornering) combined with side slope dramatically effects stability and can sometimes cause a tip over. This is a serious issue for the construction industry and results in several rollovers annually, sometimes with fatalities.

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### Slew Safe delivers peace of mind for drivers, dogman, crane owners & site owners, with improved risk management and duty of care.

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With TIDD's new Slew Safe, the operator and dogman are warned visually and audibly that they have moved into the **red zone** and is restricted from steering (slewing) any further into the red zone. The power steering is automatically reduced to 15% effectively stopping the driver from corning tighter than the load chart will permit. The operator is in no way restricted however from Steering (slewing) back into the green zone (by straightening the crane) and can operate all crane functions in the safe direction. However, it will restrict them from 'driving off the chart'.

Slew Safe simply and effectively allows the TIDD PC25 operator to pick and carry a load on site knowing that they will be warned and restricted if they get into a situation that triggers an overload parameter. No other pick and carry system can achieve this level of safety to date.

## Operation on Side Slopes

Mobile cranes are designed to be used on firm, flat and level ground (within 0.6 degrees) under AS1418.5. Any deviation from this requires an adjustment to the rated capacity. Freely suspended loads should be avoided above this gradient (AS2550.5). The following precautions should be adhered to when negotiating side slopes up to maximum allowed by the LMI:

- Surface depressions and potholes will create the same effect as a side slope.
- Ensure the tyres are inflated to correct pressure.
- Ensure the ground condition is hard enough to support the axle loads.
- The crane LMI will automatically derate the rated capacity. Based on crane side slope, pitch and articulation.
- While lifting a load the crane side slope and pitch will change due to tyre and boom deflection.
- As articulation is increased this will also add to the induced crane side slope.
- Use the minimum boom length and boom angle to keep the boom tip as close as possible to the ground. Keep the load as close as possible to the ground. Use the minimum of articulation as possible.
- If possible, keep the load uphill of the crane especially when articulated. The working radius will increase with a suspended downhill positioned load.
- Load swing will give greater instability, where possible tag line loads to prevent the pendulum type action of the load. Movements of the crane should be as smooth as possible.
- Planning a lift is important to keep within the rated capacity as the loading variables change as described above.



## Slew Safe Activation.

When the crane is operated in the GREEN and AMBER areas of the lifting chart, Slew Safe will remain inactive.

When the crane in operation moves from green and amber to RED, this is an **overload notification** (based on the lifting chart). This will activate the Slew Safe.

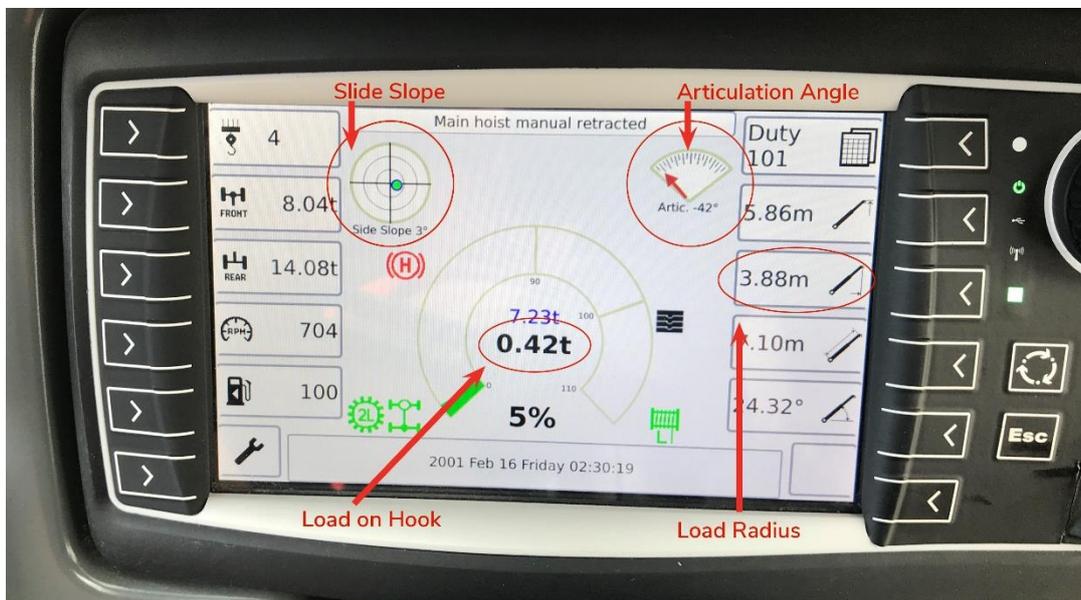
Activation of Slew Safe will:

- Reduce the speed of the steering
- Make the steering harder with feedback through the steering wheel to the driver
- The engine will “load up” making an audible change for the operator
- Audible constant alarm both inside and outside the cabin to warn the operator and dogman of the overload.

## Slew Safe Testing

The following information documents the outcomes from testing of the Slew Safe function.

### Screen Layout



## Test Lift 1 – Level ground

Articulation:  $-1^{\circ}$

Side Slope:  $0^{\circ}$

Test Load: 7.64T @ 3.52m radius

Slew Safe: **Not Activated**



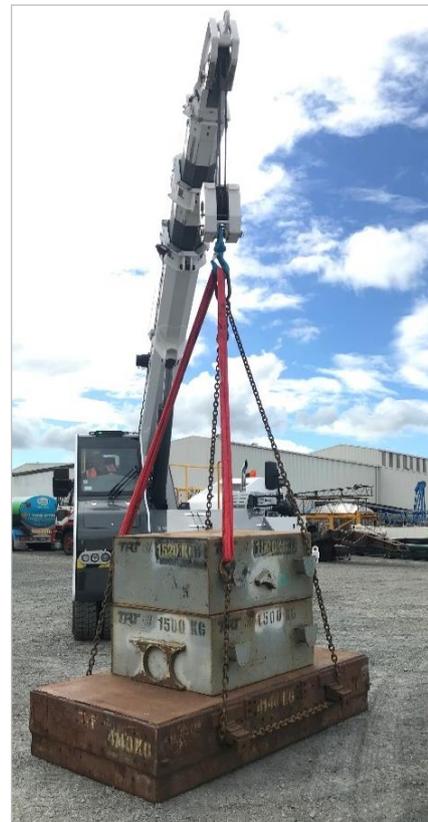
## Test Lift 2 - Facing downhill on side slope

Articulation:  $42^{\circ}$

Side Slope:  $3^{\circ}$

Test Load: 0.42T @ 3.88m radius (Load on ground)

Slew Safe: **Not Activated**



## Test Lift 3 - Facing downhill on side slope

Articulation: 42°

Side Slope: 2°

Test Load: 7.55T @ 4.03m radius

Slew Safe: **Activated**

Note: this is the same configuration as Test Lift 2, only this time the load is off the ground which increased the radius to 4.03m and activated "Slew Safe" restricting the operator from cornering further off the chart.



## Test Lift 4 - Parallel with side slope (cab on uphill side)

Articulation: 20°

Side Slope: 5°

Test Load: 7.63T @ 3.74m radius (Load not level)

Slew Safe: **Activated**



# Test Lift 5 - Parallel with side slope (cab on downhill side)

Articulation: 17°

Side Slope: 5°

Test Load: 7.65T @ 3.81m radius

Slew Safe: **Activated**



## General Information

1. This machine has been and designed tested to standards AS1418.1 and AS1418.5 for pick and carry operation on tyres.
2. The rated capacities given are for this crane as standard from factory and when all directions are strictly followed. Any deviation from the intended use or modification of the crane from standard could result in the rated capacity being reduced.
3. This crane can be hazardous if operated or maintained in a manner outside of the parameters set out in the operating, service and parts manuals.
4. Reduced rated capacities for a task shall be dictated by the operator with allowance for adverse conditions such as but not limited to:
  - The supporting surface
  - Load pendulum actions
  - Jerking
  - Sudden stopping of the crane
  - Weather
  - Dual lifting
  - Electrical wires

- Hazardous surroundings
  - Experience of personnel
5. Rated capacities are based on perfect scenarios with flat, level and firm ground (max of 1% slope/0.6°). Lifting or travelling with a load on uneven or soft ground can be hazardous and reduces the rated capacity of the crane.

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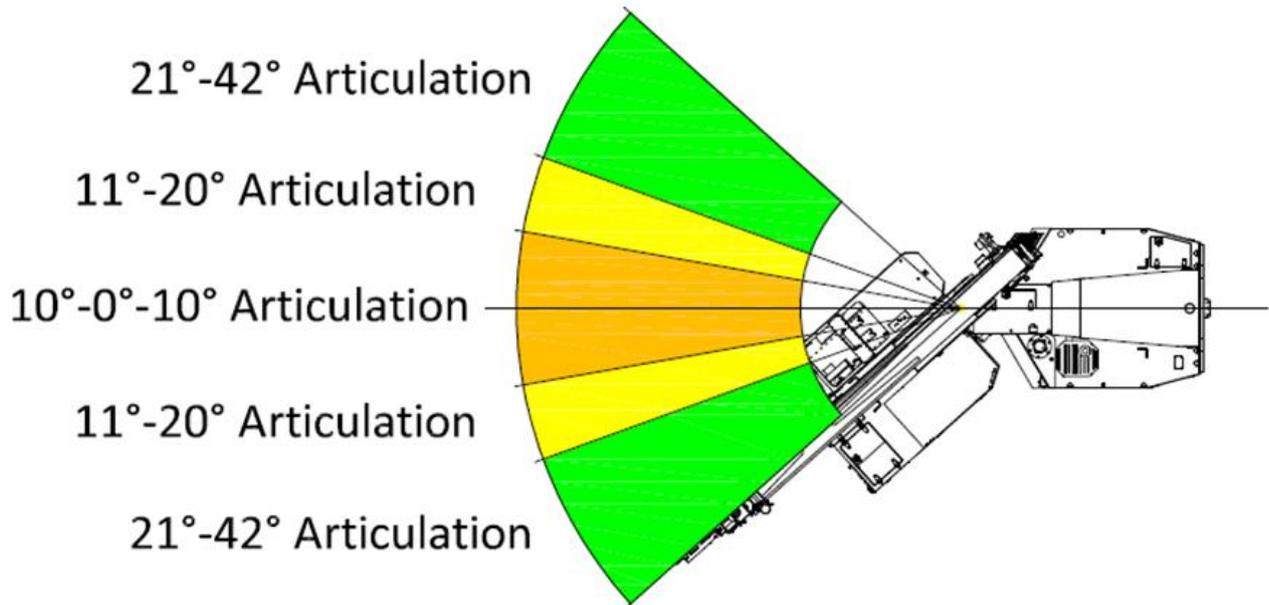
## Never attempt to drag the load

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6. Wind forces of up to 10 m/s or 36 km/h have been factored into the rated capacity. Any additional wind force should be taken into account and allowance given to the rated capacity.
7. The rated capacities given include the mass of the hooks, slings, blocks and auxiliary lifting devices. The mass of these components must be subtracted from the capacity given on the chart to give the net load weight.
8. Side loading the machine can result in structural failure or tip over. Side loads can be generated by;
- Lifting a load that is not under the hook
  - Sudden acceleration or deceleration when articulating a load
  - Dragging or pushing a load
  - Wind forces on the load and boom structure.
9. Pick and carry is available through to full articulation, the safe working load rating decreases when moving through the articulation bands.
10. The maximum speed for pick and carry operation is 2.0 km/h
11. Using this crane outside of the rated capacity or given instructions is hazardous.

Please contact us if you would like a copy of the TIDD PC25 charts or manuals that reference the information above.

## TIDD PC 25 Working Area Diagram



### Articulation

The crane pivots in the middle to allow steering and slewing of a lifted load. Working areas for the purpose of rated capacities are 0°-10°, 11°-20°, and 21°-42° of articulation, in either direction from straight ahead. Up to 42° articulation is possible in either direction - see the working area diagram.

### Deration

External influences that result in a decrease to the rated capacity, e.g. crane side slope.

### Crane Side Slope

Side tilt of the crane chassis relative to the true horizontal.

### Slope

The angle of the ground.

### Capacities

The rated capacities given in the charts above the red line are based on the structural and hydraulic competence of the machine. **Exceeding the rated capacity of the lift chart above red structural line will lead to damage of the crane.** The capacities given below the red line take into account the cranes stability.

## About TRT

A privately owned, family run business with over 50 years' experience, TRT has over 200 staff across 4 integrated businesses; Design Engineering and Manufacturing, Truck and Trailer Parts, Heavy Transport Service and Repair, and Crane Sales and Service, with head office and key manufacturing facility in Hamilton, NZ. Our Australian operation is based in Brisbane, QLD and we have a branch in Wiri, Auckland, NZ. TRT is active throughout, Australia, New Zealand and the Asia Pacific region.

Certified under ISO 9001:2015, TRT has established a reputation for innovation, engineering design excellence and manufacturing that is fit for purpose. TRT focuses on providing full, quality solutions from concept to aftermarket parts and service.

As well as the manufacturer of the TIDD PC 25, TRT manufactures a range of custom crane trailers and quality steel crane pads. TRT are distributors for Manitowoc, Grove and Potain Cranes across NZ and are the Queensland distributors for Manitowoc and Grove Cranes.

TRT are specialists in Crane 10 year major inspections and rebuilds, 24/7 crane service and repair, crane parts as well as providing quality OEM back up parts and service for the TIDD PC25 crane.

With over 50 years' experience in the crane industry across Australia and NZ, when you choose TRT, it's for the long haul.

[www.trtaust.com.au](http://www.trtaust.com.au)

[Watch our Video](#)



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