

(KOM-002)

RAIL OPERATIONS &

EMERGENCY RECOVERY PROCEDURES

RAIL-ABILITY

KOMATSU D41*-6 TRACK TYPE TRACTOR



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1 Introduction

This Operator's Manual has been compiled for the purposes of safe operation, maintenance and servicing of Rail-Ability components and systems.

For other operating details (e.g. Dozer vehicle, blade guidance systems, Road Rail Operations, Rail Gear, etc.) refer to the publications listed below.

Left or right are to be with the reader sitting in the driver's seat in the cab facing forwards, unless otherwise stated.

| Title | Part No |
|---|------------|
| Rail-Ability Operator's Manual (this manual) Original Instructions (English) | KOM002 |
| Rail-Ability Rail-Reach Parts Manual 1st Edition | GA**** |
| Rail-Ability Service Manual | KOMDRMP001 |
| EMI Safety Manual | 27581 |
| Manual of Responsibilities ANSI A92.6-1990 | 44163 |
| KOMATSU OPERATOR HAND BOOK | ***** |
| KOMATSU Service Manual | ***** |
| KOMATSU Parts Book | ***** |

Be sure the Operator's, Safety, and Responsibilities manuals are complete, legible and located with the machine.

IMPORTANT

READ, UNDERSTAND AND OBEY THE CONTENTS OF THIS OPERATOR'S MANUAL BEFORE THE OPERATION OF THIS MACHINE.

ONLY TRAINED AND AUTHORISED PERSONNEL SHALL BE PERMITTED TO OPERATE THIS MACHINE.

THIS MACHINE IS VERY COMPLEX AND POTENTIALLY DANGEROUS. IT IS IMPORTANT THAT BEFORE ANY USE OF THE MACHINE OCCURS, EXCEPT TRANSPORTATION AND MODULE HANDLING, THE FOLLOWING ACTIVITIES HAVE ALL BEEN PERFORMED AND CARRIED OUT IN THE ORDER STATED:

1. Pre-Operation Actions
2. Routine Maintenance as determined by the Pre-Operation Actions
3. Function Tests
4. Workplace Assessment
5. Operating Instructions.

THIS MANUAL SHOULD BE CONSIDERED A PERMANENT PART OF THIS MACHINE AND SHOULD REMAIN WITH THE MACHINE AT ALL TIMES.

Should you have any questions, contact Rail-Ability Ltd:

Rail-Ability Ltd
Tollgate Drive
Tollgate industrial Estate
Stafford
ST163HS

Tel: (01785) 214747

Fax: (01785) 214717

E-Mail: mail@railability.co.uk

The Rail-Ability web site is www.railability.co.uk.

2 Description and Intended Use

The Rail-Ability Bull Dozer machine consists of a construction bulldozer, with rail axle attachments for use on rail by Rail-Ability Ltd. The chassis is fitted with rail gear at the rear and a detachable rail bogie under the blade at the front to enable rail travel.

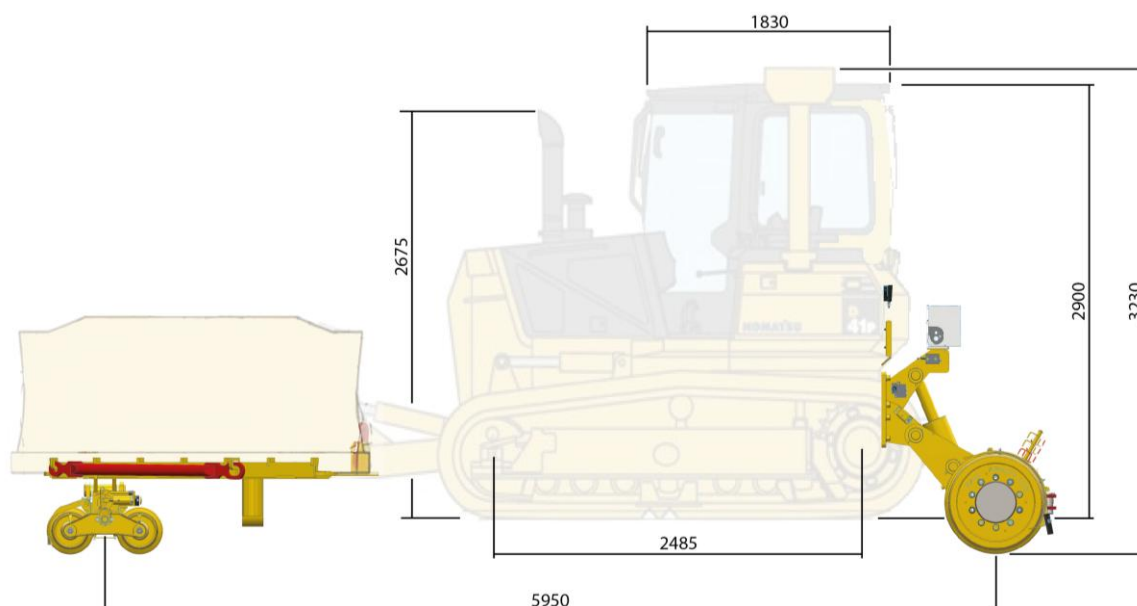
The Rail Equipment complies with the provisions of the following EC Council Directives:

- Machinery 2006/42/EC
- Electromagnetic Compatibility (EMC)2004/108/EC
- Noise Emission in the Environment by Equipment for use Outdoors 2000/14/EC.

Guidance has also been taken from European standard EN 15746:20.

For further compliance information, refer to the EC Declaration of Conformity supplied with the OEM machine.

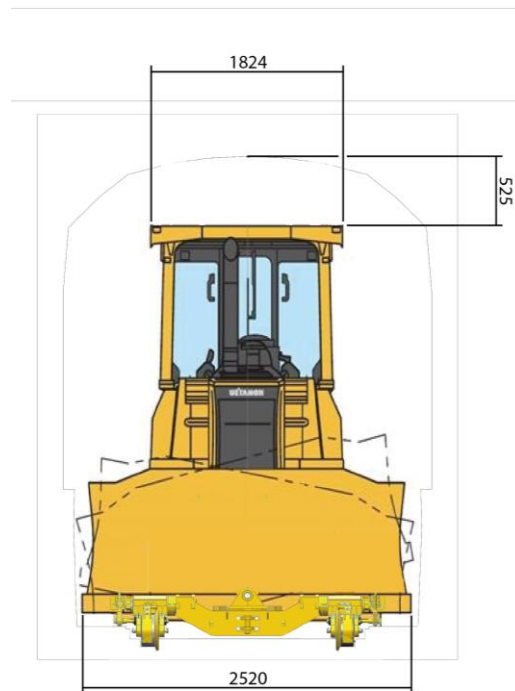
3 General Dimensions



4 Rail Specifications

The machine with the rail equipment fitted has a gross weight of 14 tonnes and the front bogie has a Tare weight of 750kg when detached from the Dozer.

5 Gauge Dimensions



6 Limitations

For limitations of use, refer to the Engineering Compliance Certificate issued for the machine.

The use of this machine is limited to its intended use, as described above. If additional or special applications or uses are required which are not covered by this Operator's Manual, carefully analyse the situation and refer to Rail-Ability Ltd for advice before proceeding.

Operational and environmental limitations of the equipment are described in the Operational Safety Precautions section of this manual.

| | |
|---|--|
|  | <p>Safety alert symbol – used to alert personnel to potential personal injury hazards. Obey all safety messages that follow this symbol to avoid possible injury or death.</p> |
|---|--|

7 Operational Safety Precautions

- All work on or near the Railway infrastructure must be carried out strictly in accordance with Railway regulations.
- Attention must be paid to Railway Group Standards and all safety precautions must be followed at all times.
- When working on electrically operated routes, be sure to observe official regulations. Always observe minimum clearance from overhead wires.
- All staff must be fully trained and assessed as competent to use this piece of equipment on Railway Infrastructure.

- See the network rail VAB engineering acceptance certificate for additional, specific machine limitations of use.
- This manual should be used in conjunction with the operators Safe System of Work and OEM manuals.
- Modifications to the vehicle must be authorised by rail-ability and a plant acceptance body that will issue an amended engineering conformance certificate. Failure to get approval will invalidate the existing engineering conformance certificate.
- This manual should remain with the machine at all times. All OPERATING personnel should be aware of its location and contents.
- It is important that all personnel are fully trained and familiar with the machine and that they have read and understood the information contained within this manual before operating in the site conditions for which the machine was designed.
- Only authorised staff may start, operate or interface with the vehicle.
- The user of the vehicle shall only operate the machine IN ACCORDANCE TO THIS MANUAL and avoid overloading.
- All personnel are obliged to take precautions given by the railway infrastructure manager.
- Personnel are NOT permitted between moving vehicles.
- The vehicle may only operate with the access adjacent to access or a line closed to all train movements or the documented safe system of work must take account of adequate safe clearances to adjacent lines.
- The vehicle is not suitable for operation of spring loaded points.
- The vehicle is not for use on live third/forth rail areas.
- The vehicle is not designed to tow or propel other machines.
- The machine is not designed to tow or propel rail trailers.
- The machine is not designed to carry or lift loads.
- The machine does not have a working mode on track. It has a travel mode only.
- The machine brakes should be checked prior to each use.
- Each machine function and interlock should be tested before the machine is put on track and / or used for work.
- For working in dusty environments the machine should be equipped with the optional pressurised cab system.
- Shearing, entrapment: the machine has a lot of moving parts that are impossible to protect, therefore the operator shall always be aware of this residual risk and keep clear from the moving parts in, particularly from the blade assembly and tracks. The operator is held responsible not only for them self but also for those working in proximity of the machine including any that are not authorized.



8 Safety Rules

DANGER. FAILURE TO OBEY THE INSTRUCTIONS AND SAFETY RULES IN THIS MANUAL MAY RESULT IN DEATH OR SERIOUS INJURY.

8.1 General

- Read, understand and obey all applicable governmental regulations.
- Read, understand and obey the employer's safety rules and worksite regulations.
- Comply with the employer's, job site and governmental rules regarding use of personal protective equipment.
- Read, understand and obey the manufacturer's instructions and safety rules, safety and operator's manuals and machine decals.
- Learn and practice the principles of safe machine operation contained in this operator's manual.
- Be properly trained to safely operate the machine.
- Always obey national traffic regulations while driving the vehicle on roads. Be aware of the vehicle's overall length, width and height.
- Avoid hazardous situations.
- The lack of maintenance may cause damage or hurt people.
- **Know and understand the safety rules before going on to the next items:**
Prior to use:
 - Always perform Pre-Operation Actions.
 - Always perform Function Tests.
 - Always perform a Workplace Inspection.
 - Only use the machine as it was intended:
 - Using the work platform for anything other than lifting personnel, along with their tools and materials, to an aerial work site is unsafe and dangerous.
 - Do not engage in stunt driving or misbehave while operating the machine.

8.2 Electrocutation Hazards

- This machine is NOT electrically insulated and will NOT provide protection from contact with or proximity to electrical current.
- When in operation maintain the minimum safe distances from electrical conductor rails and apparatus in accordance with the applicable regulations .

- **Keep away from the machine if it contacts energised power cables / rails. Personnel on the ground or in the cab must NOT touch or operate the machine until energised power lines are shut off:**
 - Do not attempt to assist someone in direct or indirect contact with the power line before the power has been disabled as you run the risk of being electrocuted yourself.
 - Warn others to stay away.
 - Call for help.
 - Contact the power company to de-energize the line.
 - If you are in the truck cabin, stay inside without touching the vehicle body because it's extremely hazardous to go out before the line is de-energised.
 - Help the electrocuted person if you know the first-aid procedures, otherwise wait for the paramedics to arrive.
- Refer to Engineering Acceptance Certificate for live OLE limitations.
- Do not use the machine as a ground for welding unless the machine is equipped with the weld line to platform option and it is properly connected.
- Inspect daily for damaged cables and wires. Replace damaged items before operating.
- Avoid contact with electrical terminals.
- Earth bonding straps:
 - Straps must be in place at all times and securely fastened.
 - Inspect the straps daily.
 - Replace straps immediately if there are any signs of burning or damage.
 - Replace damaged straps before operating.
 - Check impedance levels after refitting any straps.
- Avoid electrical shock from contact with battery terminals. Remove all rings, watches and other jewellery.

8.3 Travel Hazards

- Be aware of limited sight distance and blind spots when driving. Use a 'banksman' or machine controller when required.
- Limit travel speed according to conditions, slope, location of personnel, and any other factors, which may cause collision.
- Take care while travelling on rail, especially when the work mast is fitted.
- Beware of slippery and limited traction conditions on rail. Braking distance can increase significantly in wet or icy conditions.

8.4 Tip-over Hazards

- Do not alter or disable the safety switches (e.g. limit and proximity switches).
- Do not alter or disable machine components that in any way affect safety and stability.
- Do not replace items critical to machine stability with items of different weight or specification. If in doubt, contact Rail-Ability Ltd.
- Do not modify or alter this machine without prior written permission from Rail-Ability Ltd.

8.5 Fall Hazards

- Always sit in the seat and fasten the seat-belt when operating the cab controls.
- Always use the white steps and white handholds provided when accessing and exiting the vehicle tracks, or cab. Never climb into the cab by other means or jump from the cab onto the ground.
- Vehicle tracks:
 - Take care when on the tracks (either when accessing the cab or performing inspection or maintenance), particularly in wet or icy conditions.
 - Remove any loose equipment or tools that could fall off during transit or present a trip hazard.
 - Clean up any oil or other fluid spillages on the deck which could create a slippery surface.
 - Keep the cab clean and tidy.
 - Do not attempt to enter or exit the cab when the machine is moving.

8.6 Collision Hazards

- Check the work area for obstructions or other possible hazards.
- Do not operate the machine in the path of any other moving machinery unless precautions have been taken to prevent any potential collision. Use a 'banksman' or machine controller to alert the operator/driver when required.
- Cab:
 - Be aware of limited sight distance and blind spots when operating the machine. Use a 'banksman' or machine controller when required.
 - Be aware of blade position and tail-swing when turning.
 - Take extra care when the masts are elevated at the same time.

8.7 Crushing Hazards

- Keep hands and limbs away from moving parts of the machinery.
- Maintain safe distances between the operator, the machine and fixed objects.
- Use common sense and planning when operating the machine with a 'banksman' or controller from the ground.

8.8 Explosion and Fire Hazards

- Do not start the engine if you smell or detect Liquid Petroleum Gas (LPG), gasoline, diesel fuel or other explosive substances.
- Do not refuel the tank(s) when the engine is running.
- Refuel the tank(s) and charge the battery only in an open, well-ventilated area away from sparks, flames and lighted tobacco.
- Do not operate the machine in hazardous locations or locations where potentially flammable or explosive gases or particles may be present.
- Do not spray ether into engines equipped with glow plugs.
- Keep sparks, flames and lighted tobacco away from the batteries as batteries emit an explosive gas.

- Do not contact the battery terminals or the cable clamps with tools that may cause sparks.

8.9 Burn Hazards

- As batteries contain acid, always wear protective clothing and eye wear when working with batteries.
- Avoid spilling or contacting battery acid.
- Neutralise battery acid spills with baking soda and water.
- Do not expose batteries to water or rain.

8.10 Bodily Injury Hazards

- Do not operate a machine with a hydraulic oil or air leak as a hydraulic leak can penetrate and/or burn skin.
- Improper contact with components under any cover will cause serious injury. Only trained maintenance personnel should access compartments. Access by the operator is only advised when performing a pre-operation inspection.
- All compartments must remain closed and secured during operation.
- Always operate the machine in a well-ventilated area to avoid carbon monoxide poisoning.

8.11 Lifting Hazard

- Use the appropriate number of people and proper lifting techniques when lifting:
 - batteries
 - drawbars
 - tools
 - other removable items.

DO NOT ATTEMPT TO MANUALLY LIFT THE BLADE BOGIE.

8.12 Damaged or Malfunctioning Machine Hazards

- Do not use a damaged or malfunctioning machine.
- Tag and remove from service a damaged or malfunctioning machine.

8.13 Component Damage Hazards

- Do not use any battery or charger greater than 24V to jump-start the host vehicle OEM engine.
- Do not use the machine as a ground for welding unless the machine is equipped with the Weld Line option and is properly connected.

9 Rail Safety



DANGER. FAILURE TO OBEY THE INSTRUCTIONS AND SAFETY RULES IN THIS MANUAL MAY RESULT IN DEATH OR SERIOUS INJURY.

Failure to comply with these requirements may result in severe damage to the machine and/or the rail infrastructure.

9.1 General

- All work on or near the railway infrastructure must be carried out strictly in accordance with railway regulations.
- Always observe Network Rail codes of practice.
- Work must be carried out in accordance to rulebook GE/RT 8000 and all safety precautions must be followed at all times.
- Attention must be paid to Railway Group Standards and all safety precautions must be followed at all times.
- All staff must be fully trained and certified as competent to use this piece of equipment on railway infrastructure by the owner/operator.
- When working on electrically operated routes, be sure to observe official regulations. Always observe minimum clearance from overhead wires.
- Never use in 3rd and 4th rail areas.
- Never use on track without a possession.
- Never use on track under live OLE, ensure a relevant C Form is obtained.
- Never use on track when trains are running.
- Never On/Off-Track in areas with close proximity hazards such as in station platforms under/on bridges, in tunnels or in areas with low overhead structures or line side structures.

See the Network Rail VAB Engineering Acceptance Certificate and EC Type Examination Certificate for additional, specific machine limitations of use.

9.2 On/Off Track

- Always utilise an approved On/Off-Tracking method.
- Never On/Off-Track in areas with any cable connections to the rail.
- Never On/Off-Track in areas with ATP loop cables either in the rail web or in the “four foot”.
- Never On/Off-Track in areas with any cables cleated to the top surfaces of sleepers.
- Never On/Off -rack in areas with any signalling equipment fitted in the “four foot”.

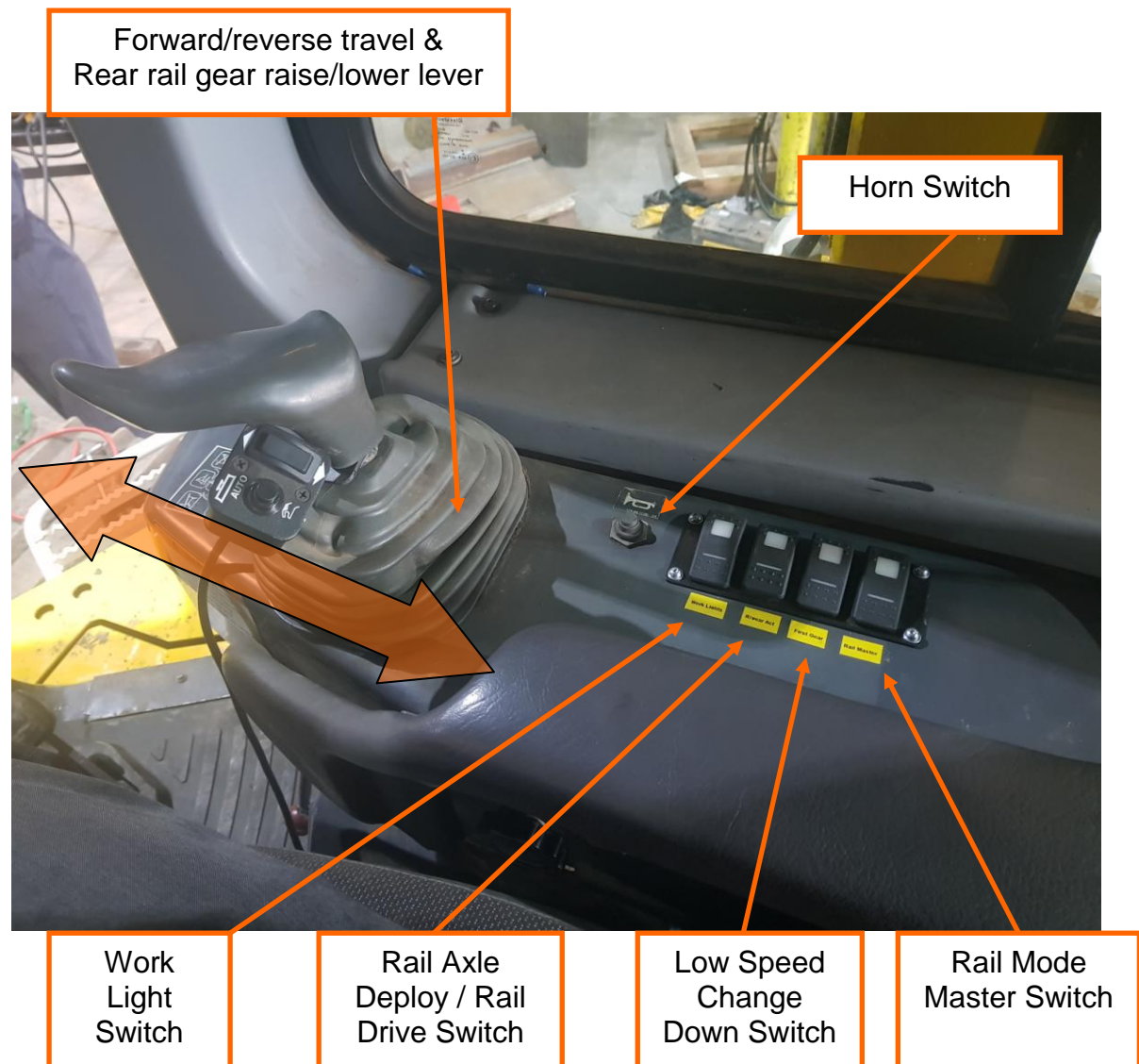


Figure 1 - Control Layout

Note: The rail mode master switch changes the operation of the lever between rail gear raise/lower, when not in rail mode & travel forward/reverse, when in rail mode.

11 Operating Control Principles

11.1 Rail Systems

This rail axle position automatically manages the rail functions for all rail-mounted operations. When operated, the blade controls are reassigned to operate the rail drive, rail brakes and rail axle deploy functions. It also activates the rail navigation lights and speed restriction system. The dozer blade shims and blade trolley lock system are all manually applied. Gauging interlocks are also maintained by the ram shims.

11.2 Blade UP-DOWN/Ripper Control Lever

Normally this operates the blade up/dn ram or ripper up/dn ram, but in rail mode this controls the rail axle up down and rail travel depending on which function is selected by the operator.

When the axle changeover is operated, this lever then raises and lowers the rear rail gear.

When the drive changeover is operated, and the secondary drive acknowledge button pressed, this lever then drives the rear rail gear forwards or backwards.

Note: Rail function will only operate if the track drive lever, cab exit lock is down to isolate the crawler travel controls.

11.3 Rail Axle Deploy/Rail Drive Change-Over

This changes between rear rail gear for raising and lowering the rear wheels and rail travel. Note that the rail travel interlock is always active when operating the rail axle ram. The light in the switch will illuminate when the rail gear is fully deployed for travel.

11.4 Rail Axle Deploy

To deploy the rear rail axle, ensure that the rail master switch is on and then press and hold the rail axle deploy switch position and operate the blade raise lower lever to raise and lower the rail drive axle. The light in the switch will illuminate when the rail axle is fully deployed for travel.

11.5 Bogie Axle Deploy

To deploy the front rail bogie, ensure that the rail master switch is on and operate the blade raise lower lever to raise and lower the blade as normal.

11.6 Blade Rams Lock

Once the blade ram locks have been inserted the locks will ensure that W6A gauge requirements are maintained. This may require the blade rams to be moved to find the position that the lock engages. The blade functions should not be actuated until the ram shims are removed again for off tracking.

11.7 Crawler Tracks Interlock

The machine will only actuate the rear rail axle ram and travel on rail with the Crawler Track Cab exit lever down. This interlock prevents the machine spinning the tracks whilst operating rail functions.



Figure 2 - Crawler Tracks Interlock

11.8 Rail Drive Acknowledge Interlock

The machine will only travel on rail with the drive acknowledge switch pressed. This interlock prevents the machine from travelling should the operator become incapacitated. The light in the switch will illuminate when the switch is activated and the rail systems is correctly set for travel.



12V Aux Socket For
Comms

Engine Revs
Lever

Rail Drive
Acknowledge

Crawler Tracks
Lever

Figure 3 - Rail Drive Acknowledge Interlock

11.9 Rail Travel

To travel on rail select the rail drive switch and the Drive Acknowledge switch then has to be pressed and held down. Simultaneously push and hold the travel lever into the forward position to initiate forward travel or pull it back for reverse travel.

11.10 Low Speed Selector

To operate the low gear selector the gear switch has to be pressed and held in. Simultaneously push and hold the travel lever into the forward position to initiate forward travel or pull it back for reverse travel.

Note: In rail mode, the machine will have a top speed of 5mph in normal mode and 2mph in low gear mode.

12 On / Off Tracking

ON/OFF TRACK THE MACHINE ONLY AT AN APPROVED ACCESS POINT.

NOTE – AN APPROVED ACCESS POINT IS ONE OF THE FOLLOWING:

- Level crossing.
- Yard where surface is level with the rail top.
- Proprietary approved track access system with rail shields.
- Consolidated ballast to at least the underside of the rail head with rail shields.

THE FOLLOWING HAZARDS SHOULD ALSO BE ADDRESSED:

- Cant - not to exceed 150mm.
- Gradient - not to exceed 1:25.
- Curve radius - not to exceed 60m.
- Ballast shoulder - must be low.
- Deep cess / soft cess must not be travelled across.
- Drainage routes, troughing routes and other services/cables must not be approached.
- OHLE, 3rd rail must be where gap exists on both sides.
- Power cables.



Care should be taken when on/off tracking with tracked excavators not to damage the railhead, suitable rail shields should be used.

When on tracking, the rear rail wheels should be aligned to the rail precisely and the bogie wheels aligned to within 250mm of the rail head. This may take several manoeuvres. The bogie can then be accurately aligned utilising the tilt and angle blade ram functions. Only once alignment has been achieved, should the rail gear be deployed.

Do not attempt to manoeuvre the dozer with the crawler tracks, when the rail gear is semi/fully deployed.

[WARNING] When on tracking, care must be taken when lowering the bogie onto the rail head to ensure all four wheels of the trolley contact the rail before the weight of the dozer is exerted onto the trolley. If the blade is not angled perpendicular with the rail within the float tolerance of the trolley at all times de-rail may occur and/or severe damage to the bogie may result.

13 Suggested On / Off Tracking Area Requirements

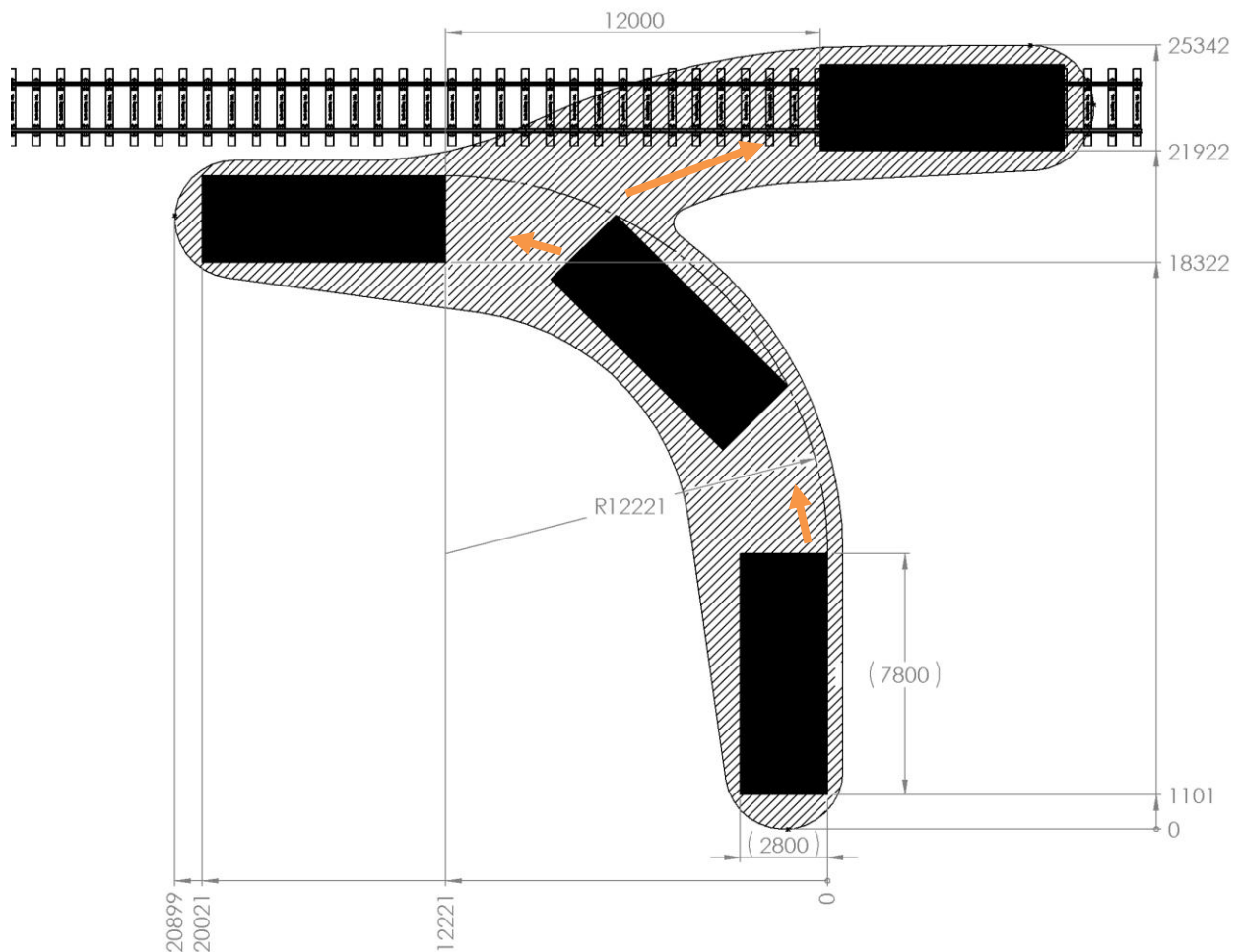


Figure 4 - On / Off Tracking Area

1. A Rail-Ability Universal Track Access System is recommended for on and off tracking a bull dozer.
2. Drive forwards and align the machine parallel to the track.
3. Reverse the machine at 30° to the track from the parallel position to traverse the track/UTAS.
4. Fully straddle the track with the Crawlers and align the front bogie and rear rail axle with the track/UTAS.
5. Deploy the rear rail axle to only just lift the rear of the machine slightly clear of the Track/UTAS.
6. Utilise the blade angle function on the machine to fine align the front rail bogie with the track.
7. Deploy the rear rail axle fully then deploy the front rail bogie until all of the ram shims can be installed.
8. Insert all four ram shims and lock in place then activate the crawler joystick cab exit interlock.
9. Travel on rail is only possible when activating the additional momentary rocker switch on the cab console with left hand.

14 Installation of Ram Strut for Travelling On Track



[WARNING] The ram struts must always be installed when the dozer is on rail. These ensure the dozer blade does not settle and hence keeps the dozer within w6 gauge requirements. Failure to fit these may result in striking line side equipment and/or structures.

[WARNING] Ensure that the blade is angled and tilted to its maximum extent and that an equal amount of blade over hang is achieved over the sides of the trolley. This ensures the dozer remains within w6 gauge requirements. Failure to ensure that this is done may result in striking line side equipment and/or structures.

When the dozer is on track release the struts from the anti-loose couplings on the back of the blade and remove the pins.



Figure 5 - Ram Strut

Operate the blade lever to deploy the blade and extend the rams just enough to slide the struts over the ram rod. Then install the retaining pins. Gradually lower the dozer onto the struts, by operating the blade lever to raise the blade.

[WARNING] Do not over extend the blade rams. If the blade is lowered excessively so that the front of the dozer is too high, extensive damage to the bogie may result.



Figure 6 - Retaining Pins

Fit the blade angle and tilt ram stops in the same way (see Figure 7).



Figure 7 - Blade Angle and Tilt Ram Stops

15 Travelling on the Rail



Figure 8 - Travelling on the Rail

Machine travel position as shown above and as follows:

- All 4X ram shims installed. (if the ram shims do not fit over the ram rods, the machine is not compliant with W6a gauge.
- WARNING - extra care and observation of line side and overhead structures is required when the machine is fitted with masts that have a working mode that can be outside the W6a travel gauge.
- Failure to comply with these requirements may result in severe damage to the machine and/or the rail infrastructure.

16 Bogie Handling



- Never lift the entire machine with a crane.
- The machine must be parked on a level surface.
- The machine must be secured to prevent rolling while the bogie is being demounted.
- If the bogie being lifted, be sure the crane vehicle capacity, and lifting chains or straps are sufficient to withstand the bogie weight. See the serial plate on the bogie for the bogie weight.
- Do not demount removable bogie when on a slope.
- The bogie must be in contact with the ground first.
- Never demount the bogie with the blade out of the stowed positions.
- Always fully stow the blade before disengaging the bogie locks.
- Always refasten secondary locking pins each and every time they are removed.
- Always latch and padlock the bogie locks.

17 Front Bogie Connect/Disconnect

The blade trolley locates between the cutting edge on the blade and the blade retaining profiles on the trolley. The hook locks on the trolley must be aligned with the bar plates on the back of the blade. This ensures correct blade to trolley alignment is maintained.

To install the trolley under the blade manoeuvre and lower the blade until it aligns with the trolley blade locating profiles and the hook locks align with the blade bar plates.



Figure 9 - Front Bogie Connection

Engage the hook locks by rotating the hook profiles over the blade bars, then lock them with the secondary pins.



Figure 10 - Hook Locks

Connect the trolley brake connection hose to the machine bonnet hydraulic quick release coupling.



Figure 11 - Brake Connection Hose

The blade can now be raised fully to lift of the bogie clear of the ground and the machine can be moved.

To disconnect the bogie from the machine follow this procedure in reverse order.

To remove the trolley from the blade lower the blade until the trolley contacts level ground.

Disconnect the trolley brake connection hose.

The secondary pins can be secured from unintentional disengagement by padlocking them in place through the ends.



Figure 12 - Front Bogie Disconnection

18 Emergency Off Tracking

Emergency off tracking may be necessary during the working lifespan of the machine. It must be stressed that this is an emergency procedure only and should not be used in the normal cause of events. If you are asked to off track using this method, at an unprepared location, without suitable justification you should report to your on call manager and ask his advice before attempting this manoeuvre. If there is real cause to use this method there are certain procedures that should be followed:

- The off tracking area must be inspected for its suitability as normal.
- An area where there are no obstructions should be selected. For example, there should be no conductor rail present, no high ballast shoulders and no obvious services cables or hazards.
- Emergency off tracking must not be carried out on cants.

In the event of a real emergency the procedure for off tracking is as follows:

- Approach the off tracking at a safe speed.
- Sound the horn to alert personnel at the off tracking area as you approach.
- Raise the rail wheels fully. Including the front bogie
- Turn the machine keeping the tracks on the rail head
- Manoeuvre the machine on the railhead until the machine is perpendicular to the rail
- Track the machine clear of the running rail.
- When carrying out this operation always follow any hand signals and carry out all movements smoothly at a safe speed.

[WARNING] When off tracking, care must be taken when the dozer manoeuvres off the rail head. Make certain that the blade is raised up to the maximum height for travel. If the dozer tips/tilts forward severely onto the trolley while climbing off the rail head and the weight of the dozer is exerted excessively onto the trolley severe damage to the bogie may result.

Grounding out the trolley whilst the dozer is travelling off rail may result in severe damage to the bogie.



19 Rail Lights

Operation of the rail lights is automatically controlled by a direction sensor located at one of the rail wheels, to provide the correct colour lights according to the Travel direction. The rail master switch activates the rail marker lighting system. This switch should always be on whenever the machine is on the track. When the machine is stationary red lights show at both ends. When moving, the white lights will illuminate and the red lights will be turned off by the system in the direction of travel.

Power for the rail lights is provided by an on-board 24V system. Lamp irons are also provided if the lighting system fails or if the battery gets discharged. Battery charging is provided by the machine alternator.

20 Earth Bonding Straps

Earth bonding straps are fitted on the machine between the chassis and rear rail axle and the chassis to blade.

Earth bonding straps must be in place at all times and securely fastened.

Replace immediately if any signs have burning or damage.

Check impedance levels after refitting any straps.



Figure 13 - Earth Bonding Straps

21 Emergency Recovery

If your machine breaks down in such a position that it is likely to obstruct an adjacent line or cause an accident or damage to the railway infrastructure or any other vehicle, it is important that the machine is placed in a safe position as soon as possible. For this reason the Komatsu track type tractor has been fitted with an auxiliary power system and a tow bar by which another machine can tow it to safety.

Instructions on how the auxiliary system works are described in a separate section of your operators handbook; you must make a point of reading and understanding the procedures so that in the event of a machine failure you are able to put the machine in a safe position.

The main points are:

- Connect your machine and recovery vehicle together with the approved tow bar.
- Only release the park brake of the failed machine once the tow bar has been connected to the recovery vehicle otherwise the machine might run away.
- Do not remain in the cab of the machine being towed.
- Ensure that towing is carried out at a slow speed approximately 2 MPH as the recovery vehicle has to brake for both vehicles, at a higher speed braking distance would be greatly increased.

**RECOVERY OF THE MACHINE IN THE EVENT
OF A BREAKDOWN WHILST ON THE TRACK**



Recovery Pump
Handle
Stowage

Hand Recovery
Pump



Figure 14 - Emergency Recovery

The rear rail axle can be raised to enable the machine to be removed from the rail track by using the hand pump shown above. Note the pump is hosed up ready for recovery (no other action is necessary).

To recover the machine when mounted on the front bogie, back off the brake adjuster as shown in photograph below (13mm spanner required).



Figure 15 - Brake Adjuster

22 Towing

Towing on rail wheels

[WARNING] The dozer should be coupled to the towing machine before this procedure is followed. The dozer brakes are disabled when in free – wheel mode. **Failure to couple the dozer initially may result in it rolling away.**

1. Remove centre plug using 22mm allen key (see Figure 16).



Figure 16 - Centre Plug Removal

2. Remove centre shaft, this is tapped M6 to assist (see Figure 17).

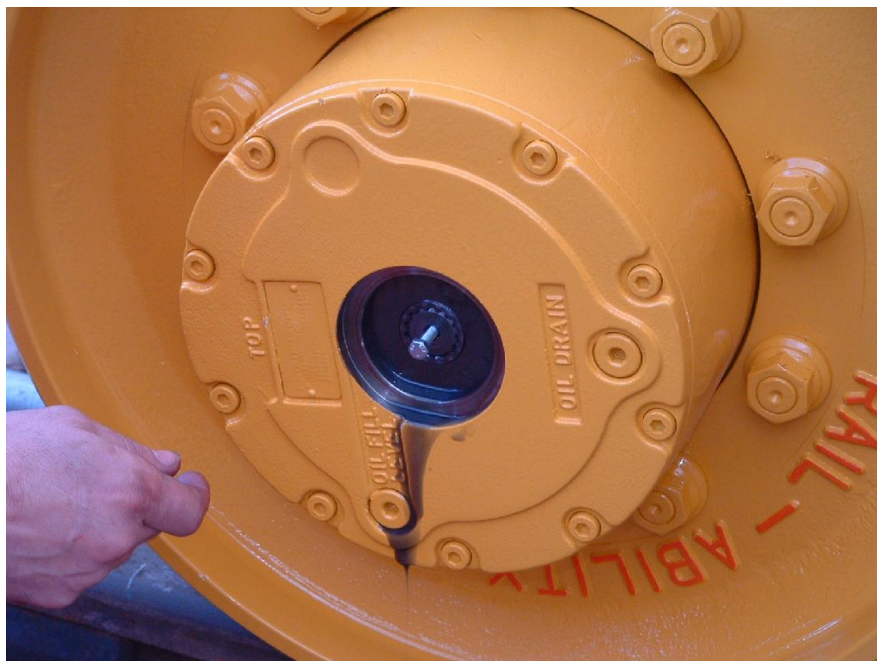


Figure 17 - Centre Shaft Removal

3. Removal (keep shaft in a safe, clean place, see Figure 18).



Figure 18 - Centre Shaft Extraction

4. Refit centre plug (to prevent contamination of gear box, see Figure 19).



Figure 19 - Plug Refit

5. Repeat on each gear box.
6. Gearboxes are in free-wheel to allow the dozer to be towed towing.

[WARNING] The towing jaw on the rear rail gear is for means of towing the dozer for recovery on rail only. Overloading this towing jaw may result in severe damage to the rail gear. This jaw is not to be used to tow the dozer when working on its tracks.

Do not use this jaw to recover the dozer if it becomes bogged down.

Do not use this jaw to tow rail trailers or any types of rail mounted plant. The dozer is not approved or certified for towing whilst on rail.

23 After Each Use

Perform the following steps at the end of every work shift.

- Ensure the Rail bogie is refitted.
- Off-Track the machine.
- Park the machine on a firm level surface, clear of obstruction and traffic at least 3 metres away from the nearest railway lines.
- Turn off the ignition, remove the keys and lock both cab doors to secure from unauthorised use.

24 Transportation



24.1 General

- Never lift the machine with a crane.
- The transport vehicle must be parked on a level surface.
- The transport vehicle must be secured to prevent rolling while the machine is being loaded.
- Be sure the transport vehicle capacity, loading surfaces and chains or straps are sufficient to withstand the machine weight. See the Data Panel on the machine for the machine weight or the Specification section on the ECC.

Towing the machine is not recommended. If the machine must be towed due to failure on track, do not exceed 6 mph.

24.2 Loading

- Do not drive the machine on a slope that exceeds the slope rating. See the OEM Operating Instructions.
- If the slope of the transport vehicle bed exceeds the maximum slope rating, the machine must not be loaded and a suitable transport vehicle must be obtained.

After the machine is loaded:

1. Ensure that the rear rail gear remains raised after loading. Only the bogie wheels and the crawlers must be contacting the deck of the transport vehicle.

2. Ensure that the machine parking brake is applied.
3. Never leave the machine in gear as this can damage the transmission.
4. Ensure that the bogie is secure if fitted.

24.3 Lashing Rings

The lashing rings can be used to chain the machine down when it is carried as a load on a lorry.

Note: They are not suitable for lifting the machine from.

There is a centre lifting point on the bogie for lifting the bogie only when it is detached from the machine.

24.4 Transit

- Turn the machine ignition key switch to the off position, remove the key and lock the cab doors before transporting.
- Inspect the entire machine for loose or unsecured items.
- Use chains of ample load capacity.
- Use a minimum of 2 chains per side.
- Adjust the restraints to prevent damage to the chains and machine.
- Never chain over the bonnet, cab, rail axle, rams or rail bogie.
- Only chain to the dedicated identified chaining-down eyes.

25 Decals

Refer to the Maintenance Instructions and verify that all decals are legible and in place.