



KINGSTON EARTHMOVING EQUIPMENT GUIDE

PRIME EARTHMOVING FUNCTIONS

Machine Classification	Trenching	Excavation	Loading	Levelling	Pushing	Carting	Compacting
Backhoe Loader	M	S	S	S		S	
Trenchers	S						
Mini Excavators	M	S	S	S			
Excavators	L	L	L	S			S
Traxcavators		M	M	M	M	S	S
Front End Loaders		S	M	M		M	
Skid Steer Loaders	S	S	S	S		S	
Telescopic Handlers			S			S	
Dozers		L		L	L		M
Swamp Dozers		L		L	L		M
Scrapers		L				L	
Graders				L	S		
Compaction Rollers							S - L
Landfill Compactors					S		

JOB SIZE

S - Small

M - Medium

L - Large

HOW YOU CAN HELP US

Kingston Plant Hire's friendly customer service staff are more than happy to discuss your earthmoving needs over the phone, and where required, can organise a site visit by one of our field representatives. However you can help us by ensuring you have taken the following steps.

- Call **'Dial Before You Dig'** on 1100 or visit <http://1100.com.au/> before commencing ANY excavation work.
- Check your job site for any height or width restrictions that may prevent a machine entering.
- Determine if your jobsite has any special OH&S requirements that KPH should know about (for induction purposes etc)
- Ascertain what sort of work will be performed & what buckets/ancillary equipment may be required.
- Determine how long you will need the equipment for.

BACKHOES



The Backhoe-Loader is the most versatile of all Earthmoving Machinery. This is due to its front and rear digging and loading operation, rubber tyres & road registration.

USES -

- 1. Principal Use** - Used for digging trenches, drains and footings.
- 2. Carting** - Carrying and/or loading material into Tip Trucks/Waste Bins.
- 3. Excavations** - For small jobs in 'soft' ground e.g. swimming pools, cellars, paths and driveways.
- 4. Levelling/Spreading** - Light material such as sand and crushed rock.
- 5. Other uses** - Tree removal, small demolition jobs, breaking out concrete paths/driveways and site clean-ups
- 6. Combination** - Some backhoes come as a "combination" with a tip truck. This is generally more cost effective when disposing small quantities of material off site or transporting material around large sites.

OPERATIONAL -

- 1. Road Registered Vehicle** - Backhoes are able to work on roadways and to drive to other work sites. As most Earthmoving equipment needs to be transported this allows greater flexibility and cost savings. Some backhoes are also transported on a truck.
- 2. Rubber Tyres** - Tyres enable these machines to work on concrete and asphalt surfaces without causing damage. They are not as effective as track machinery in muddy/wet conditions, but have a faster operating speed than track machines.
- 3. Confined Spaces** - As they are a relatively large machine they are restricted in small work areas and are usually replaced by Bobcat Backhoes or Mini Excavators (depending on the job).
A feature of the backhoe side shift is its ability to dig trenches close to buildings and fence lines. The backhoe can also reach into narrow areas or under low clearances (this is restricted to the length of arm).

ANCILLARY EQUIPMENT/OPTIONS AVAILABLE -

- 1. Multi-purpose (4 in 1) front loading bucket** - Handy for use in clean ups, grading, dozing, picking up large rocks, tree trunks.
- 2. 4 W.D.** - Provides extra traction in wet conditions.
- 3. Backhoe Buckets** - Many different size buckets available, most backhoes come with (3) standard size buckets (300mm, 450mm & 600mm) plus side cutters (which adds 75mm to digging width).
- 4. Extender Arm** - Can provide extra digging depth.
- 5. Forks** - Handy for lifting pallets, pipes, containers etc.



TRENCHERS



Kingston can supply Rubber-tyred chain trenchers (commonly known as the "Ditch Witch") as the name suggests, they are used to dig trenches.

USES -

1. Trenching - Their primary use is digging trenches in soil. In this application they are much faster than Backhoes and Excavators but can be limited by both the width and depth of digging. These trenchers are not designed to work in hard ground such as rock or reef or where there are lots of tree roots or buried timber, bricks etc.

OPERATIONAL -

1. Used to dig trenches in soil.

ANCILLARY EQUIPMENT/OPTIONS AVAILABLE -

1. **Blade** - to backfill trenches and grade surfaces.
2. **Offset facility** - places excavated material to one side of trench.
3. **Proximity** - Allows trench to be excavated next to walls, etc.

EXCAVATORS



The Hydraulic Excavator is one of the most used Earthmoving machines for a variety of reasons, including -

Efficient operation: Capable of handling a wide range of applications

Large equipment range – ranging from a tiny 1/2 tonne machine up to a massive 500 tonnes

Lower operating costs than similar functioning machinery.

Kingston mostly supplies Excavators in the 2 to 40 tonne (operating weight) category. We are a specialist hirer of Mini Excavators for confined space work.

Care must be taking when hiring these machines as their tracks can cause damage to paved, concreted & asphalted surfaces. Small to mid-sized excavators (up to 13 tonne) are available on rubber tracks & pads which allows them to traverse these surfaces whilst minimising damage. Excavators are not a "carrying" machine however. They have a very slow drive speed, making them inefficient for this purpose.

USES -

1. Digging trenches drains etc - The large range of Excavators available provide a far wider application capability than the Backhoe, allowing greater digging width and depth, handling larger volumes of material and being more suited to confined areas.

2. Excavation/Loading - As the name suggests this type of machinery is used extensively on bulk excavations such as building sites, roadways, dams and quarrying. They are best suited to situations where material can be excavated and loaded from the same spot.

3. Demolition - Ideal for this type of work with ancillary attachments such as a breaker or grapples.

4. Rock, Concrete and Bitumen - The Excavator is the perfect machine for most applications with this type of material. By using a Hammer (or Rock Breaker) they can excavate/break-up most hard materials; the size of the excavator and hammer required is dependent on the hardness and volume of material.

The hammer has reduced the need to use explosives. Softer rock such as shale & mudstone can be efficiently excavated by larger machines using just buckets.

5. Levelling - Efficient at levelling sites, embankments, etc.

OPERATIONAL-

1. Tracked Machine - Well suited to working in wet conditions as they can dig and load from the one spot (causing minimal site damage compared to machines that have to carry material)

2. Confined Spaces – With some excavators capable of rotating 360 degrees, Small Excavators are usually a suitable machine for working in tight areas.

3. Unregistered Vehicle – Unlike Backhoes, Excavators are not able to crawl/track on public roads.

4. Transport - All Excavators are floated to jobs; Mini Excavators normally come with their own transport vehicle which allows greater flexibility (Refer Heavy Transport).

5. Compaction – Track roll or with compaction plate attachment.

ANCILLARY EQUIPMENT/OPTIONS AVAILABLE -

1. Buckets-

a. Standard - Various widths ranging from 300mm to 2 metres.

b. Mud Bucket – A smooth edged bucket used for digging mud, loading and site levelling.

2. Quick Hitch' – A fitting that allows for quick change over of buckets, hammers, etc.

3. Hammers (Rock Breakers) - A very common attachment for breaking up rock, concrete and asphalt.

4. Grab/Grapple - For picking up trees/ rocks.

5. Ripper/Scarifier - For opening up/ ripping solid ground.

6. Compactor Plates/Wheels - For compacting filled trenches, roadways etc.

7. Offset and "Knuckle" Booms - Allows machine to dig "off-centre"

8. Dozer Blade - Mostly fitted to Mini Excavators, used for backfilling trenches.

9. Cutting Saws/Shears - For cutting reo and steel, mainly used by demolishers.

10. Extender Arm/Boom - Provides extra reach, digging depth.

11. Rubber Tracks - Available for Mini Excavators up to 3 tonnes

12. Post Hole Auger - For digging post holes, etc.

13. Laser levels - Accurate trenching & levels

TRAXCAVATOR (TRACK LOADER)



The Traxcavator (or Drott) is a piece of earthmoving equipment generally suited for carrying material on larger excavation projects. They have a quicker carrying speed & a large bucket capacity than most Excavators. As with an excavator, care must be taking when hiring these machines as their tracks can cause damage to paved, concreted & asphalted surfaces.

USES -

1. Excavating, Carting and Loading

2. Site Levelling – Traxcavators are also quite proficient at boxing out roadways, trimming sites, cut and fill sites and generally working to a level

3. Ripping ground - Most Traxcavators have rear mounted rippers fitted as standard equipment; used for loosening up hard ground.

4. Compacting - Through "track rolling" and/or with towed vibrating rollers, they are an effective compaction machine.

5. Site Clean-ups/Demolitions – Traxcavators can be an excellent machine for loading heavy and bulky materials such as trees, timber, concrete slabs & rocks. As many of the smaller Traxcavators come in a combination with a Tip Truck they are most cost efficient on small jobs of this type.

OPERATIONAL -

1. Tracked Machine – Traxcavators are better suited to wet/muddy conditions than rubber-tyred machines but not as effective as the Excavator. They can traverse difficult terrain such as steep slopes.

2. Unregistered Vehicle - Not able to crawl along public roads

3. Transport - All Traxcavators are floated to jobs; most small and some larger machines come with their own transport vehicle (refer Heavy Transport).

ANCILLARY EQUIPMENT/OPTIONS AVAILABLE -

1. Multi purpose (4 in 1) bucket - Standard on most machines

2. Rippers (rear mounted) – Also standard on most machines.

3. Draw or Tow Bar - For towing rollers, etc.

4. Teeth for Bucket

6. Low Ground Pressure Tracks – This allows the machine to work in very wet conditions; These are not very common.

RUBBER - TYRED LOADERS



The Rubber-tyred Loader (commonly called Front End Loaders) are a high speed loading machine, best suited when working on road/compacted surfaces. Front End Loaders are used extensively by Road Contractors, in Quarries, on Golf Courses and with Concrete/Garden Supply distributors.

Rubber-tyred Loaders range from 1 tonne through to 127 tonne machines: Kingston primarily hires Loaders in the 7 to 20 tonne range.

All though most loaders are 4WD, they can struggle in wet conditions due to their rubber tyres.

USES -

- 1. Loading** – Fast loading, particularly out of stock piles and storage bins; they have a high bucket dumping height.
- 2. Carting** – Wheel loaders travel much faster than track machines, and are an excellent machine when material needs to be carried on site and/or over a short distance; where tip trucks not suited by distance or terrain.

OPERATIONAL-

- 1. Registered Vehicle** - Some Rubber-tyred Loaders are registered for road use.
- 2. Rubber Tyred** - Able to work on asphalt, concrete and crushed rock surfaces without damaging. They have much faster operating speeds than track machines. The majority of Loaders are 4WD.
- 3. Confined Spaces** - Whilst they can be classed as big machines they have excellent manoeuvrability through their articulated steering.
- 4. Transport** – They required a Low Loader to float them to a jobsite. (Refer Heavy Transport).

ANICILLARY EQUIPMENT / OPTIONS AVAILABLE -

- 1. Multi-purpose (4 in 1) bucket**
- 2. Teeth for bucket**
- 3. Forks**
- 4. Backhoe**
- 5. Draw or Tow Bar** - used to tow rollers, trailers, water carts, etc.



SKIDSTEER LOADERS / POSITRAK



The Skidsteer Loader (often referred to as a Bobcat) is a little workhorse. As its name suggests, its basic function is loading, however, with the wide range of options available to it the Skidsteer Loader is capable of undertaking just about every little earthmoving application. A Positrak loader resembles a Skidsteer Loader with the exception that it is a tracked machine, allowing for greater site access during wet conditions. However given their small stature, they are not always able to load some larger trucks or bins.

USES -

1. **Carrying and/or loading** – Loading into Tip Trucks/Waste Bins. This is the perfect machine for small site clean-ups.
2. **Combination** - Most come as a combination with a tip truck & are generally very cost effective when removing material from site or carting on site.
3. **Back filling** – Trenches, Pits etc
4. **Light Excavations** - For excavating paths, driveways, small swimming pools, house sites, etc. in soft ground.
5. **Landscaping/Paving** - Commonly used in these applications as Skidsteer loaders can dig, load, transport, spread, level etc. and has excellent mobility

OPERATIONAL -

1. **Registered Vehicle** - Only a few Skidsteer Loaders are registered for road use. Machines are normally transported on trucks or trailers.
2. **Rubber Tyred** - Able to work on all surfaces and conditions except muddy ground.
3. **Steering** - Allows for very small turning area but not suited to wet ground or soft ground
4. **Confined Spaces** - Skidsteer Loaders are a specialist confined-space machine, with narrow width, low height, short length and minimal turning circle.
5. **Speed** - the Skidsteer Loader is a very quick machine & works best over relatively short distances.

ANCILLARY EQUIPMENT/OPTIONS AVAILABLE -

1. **Backhoe** – Once a very common attachment, this attachment performs the same function as normal Backhoes but have smaller digging depth and slower operation. Principally used for small trenching jobs or in confined spaces. Both side shift and centre mounted backhoe attachments are available. Many different size buckets available but the standard bucket sizes are 300mm and 450mm.
2. **Tracked Machine** – Also known as a 'Positrak'. They are generally on rubber tracks which allow machines to work in wet/muddy conditions. These do attract a higher rate however
3. **Multi-purpose bucket** – Also known as a '4 in 1 bucket'. The front loading bucket fitted to the majority of machines.
4. **Forks** - for lifting pallets, pipes, etc.
5. **Post Hole Digger/Borer** – Also known as an Auger
6. **Trencher**
7. **Broom**

DOZERS



Commonly known as a Bulldozer, the Dozer's main functions are ripping, stripping, pushing over, levelling and compaction. They perform best over short distances. They can work in soil or rock.

Dozers range from small 5 tonne machines up to a massive 88 tonnes; Kingston supply machines in the 7 to 40 tonne categories.

The large dozers are mostly used in Mining and Quarry work. Dozers are also used extensively in the Forestry and Sanitary Landfill Industries.

USES -

- 1. Stripping** – Levelling & stockpiling top soil, over-burden etc
- 2. Land clearing and levelling** - e.g. trees, scrub, rocks, "cut and fill" sites; can handle large volumes and heavy / bulky material.
- 3. Excavate, spread and compact material** - e.g. dams, land fill. Work most effectively over short distances. Through "track rolling" and: or with vibrating roller, very effective compaction machine.
- 4. Ripping ground** - Most machines have rear mounted "rippers" fitted; used for loosening up or ripping out hard ground including rock.
- 5. Pushing Scrapers** - Used as a combination with (Open Bowl) Scrapers; push Scrapers when loading materials, increases loading efficiency, particularly when working in hard or wet ground.

OPERATION -

- 1. Track (Crawler) Machine** - designed to work on hilly terrain.
- 2. Unregistered Vehicle** - Not able to work on public roads.
- 3. Transport** - The majority of these machines are "over width" and special conditions apply to their movement. They may require pilot cars, and hours for transportation are restricted (refer Heavy Transport).

ANCILLARY EQUIPMENT/OPTIONS AVAILABLE -

- 1. Rear mounted Rippers** - Standard on most machines.
- 2. Draw or Tow Bar** - For towing rollers
- 3. Tilt/Angle Blades**
- 4. Winch**
- 5. Special blade attachments** - For land clearing and tip work
- 6. Low Ground Pressure Tracks** - For working in very wet/muddy conditions. Also known as a Swamp Dozer
- 7. GPS Attachment** – Useful when your job site needs to be levelled or scraped to the centimetre

SCRAPERS



Scrapers are principally used for the bulk excavation/stripping of soft materials, their transportation and placement on-site. They are not suitable for use in wet & muddy conditions

There are two types of Scrapers, being:-

1. **Self Elevating** –Have a smaller load capacity (range from 4 to 27m³) than the Open Bowl Scrapers but are self-loading, work better to level and have greater manoeuvrability. The self-elevating mechanism fitted to the bowl allows fast and full loading and at the same time breaks up the material.
2. **Open Bowl** – Which have a large load capacity (15 to 35m³) & normally work in conjunction with a Dozer as a "push" machine to enable efficient loading, particularly on hard and wet ground. Twin powered Open Bowl Scrapers have a second motor that drives the rear wheels of the Scraper which provides greater loading power and traction.

USES -

1. **Stripping** - Stripping top-soil/overburden and stockpiling on-site.
2. **Excavations** - Roads, ovals, dams; cut and fill work etc
3. **Landfill works** - Excavating soil/sand/clay and carting over unmade roads or paddocks.

OPERATIONAL -

1. **Rubber tyred**
2. **Transport** - Larger machines can be very expensive to transport to and from the job. (Refer Heavy Transport).



GRADERS



Graders are primarily a trimming and levelling machine and they have the added option of ripping. Grader Operators generally need to be highly skilled and have an excellent eye for levels. At Kingston we specialise in 'final trim' operators but please advise at the time of ordering if this is required.

USES-

1. **Final Trim** - the Grader is the machine used for final trim and "working to level" in road construction and associated works, including the placement of the crush rock.
2. **Levelling** - Re-establishment of dirt/gravel roads and open areas.
3. **Tilt Blade Facility** - Cutting, trimming and levelling embankments
4. **Ripping/Scarifying** - To remove old pavement, loosen hard ground.

OPERATION-

1. **Registered Vehicle**
2. **Rubber tyred**
3. **Transport** - Self driven over short distances, floated over longer distances (refer Heavy Transport).
4. **Confined Spaces** - Graders with articulated steering, or that are fitted with a front mounted blade work most effectively in tight areas.

ANCILLARY EQUIPMENT/OPTIONS AVAILABLE -

1. **GPS Attachment** – Useful when your job site needs to be levelled or scraped to the centimetre

COMPACTION EQUIPMENT – ROLLERS



There is a wide range of Rollers suitable for every compaction requirement, the following listing summarises the main component functions of Rollers:-

1. Compaction method - Vibratory or Static
2. Operation - Towed or Self Propelled/Ride on or Pedestrian/ Walk Behind
3. Type - Smooth Drum or Pad/ Sheepfoot or Rubber Tyred
4. Drive - Single or Tandem (Including 3 Point Rollers)
5. Weight - range from a two tonne Pedestrian Roller up to a 36 tonne multi-tyred roller. The type of roller used depends on the material and the size of job.

In general terms, materials can be summarised as:-

- 1. SOIL**- As this material has low cohesion it can be compacted in relatively thick layers (as long as it has a low water content) It compacts better with some clay in the material. Vibratory smooth drum rollers are the most suitable machine for this material.
- 2. CLAY** - This type of material is used extensively as fill material. Clay is a most cohesive material and with low water content can achieve high level of compaction. Either Static or Vibrating Pad/ Sheepfoot rollers are the most suitable machines; fill layers should range between 150 to 300mm, depending on size of roller, for best compaction results. Compacted clay fill should be "sealed" for when it rains, this can be achieved through track rolling (e.g. dozer) and/or with a smooth drum roller.
- 3. SAND / GRAVEL** - Maximum compaction is achieved at either a total dry or a very wet condition. Vibratory smooth drum rollers are the most suitable for these two materials.
- 2. ROCK FILL** - Mostly used as fill or foundation material. Vibratory smooth drum rollers are the most suitable for this material; normally work in conjunction with a track machine e.g. dozer, which will spread and level the material and provide some compaction.
- 5. ROAD MAKING ROCK**
 Base Course (normally coarse crushed rock with a degree of fine content) - This material requires a high compaction level. Heavy smooth drum vibratory rollers are most suitable for this application.
 Top Course (fine crushed graded rock) - High compaction required; heavy tandem smooth drum vibratory rollers most effective compacting layers up to 250mm. Rubber tired rollers are often used in conjunction with vibratory rollers.
- 6. ASPHALT** Require a smooth drum vibratory roller (normally tandem) for compaction and static roller for finishing (can be drum or rubber tyred).



COMPACTION EQUIPMENT – LANDFILL COMPACTORS



For earthmoving purposes the machine is designed principally to spread and compact material in land reclamation projects. They are also used extensively in Landfill sites to spread and compact waste materials. The Compactor drives on specially designed metal drum wheels with pads/teeth attached. They travel at much quicker speeds than track machines

Compactors can be fitted with a front mounted dozer blade or loading bucket. In our applications machines generally are fitted with blades, which allows levelling of material (not excavation) for better compaction and finish.



HEAVY TRANSPORT



All track machines and a majority of rubber tyred machines are "floated" to jobs.

Float transport includes:-

Small - Tandem trailers, tip trucks, single drive tilt tray trucks.

Medium - Tandem drive tilt tray trucks, single and tandem axle low loaders and step deck trailers with single drive prime movers.

Large - Tandem, tri-axle and quad-axle low loaders with tandem drive prime mover.

Larger sized machinery can sometimes exceed the dimensions allowable by law to travel unrestricted on Victorian roads. These machines then need to be floated out of peak traffic times & may need a pilot car to escort them.

There are many factors that must be considered in coordinating float movement. Our operations staff will ensure the correct information is gathered and the appropriate actions taken. We have access to numerous reliable Heavy Haulage companies that transport our Sub-Contractors machines to and from site.

TIP TRUCKS



Tip Trucks form a major component of the Earthmoving Industry through the transport and disposal of materials. Transport and disposal costs are often a significant expense with many earthmoving jobs, it is therefore essential to obtain professional advice to ascertain the most economical method of loading, carting and disposing of materials.

Common materials to be removed by tip trucks include clean fill, clay, rubbish, rocks, bricks, asphalt, mixed fill & concrete. Some trucks & drivers are certified to cart contaminated material but these need to be carefully managed & thoroughly organised.

There are three main Tip Truck categories:

1. Small (Single drive vehicles with 5-6m³ capacity)

Small Tip Trucks are mostly used when working in confined locations with small volume of materials. They are used significantly as a combination unit with earthmoving machines such as Skidsteer Loaders and small excavators

2. Medium (Tandem drive Vehicles with 10m³ capacity)

Tandem drive Tip Trucks are the most common type. They are generally more economical than the small trucks but can be restricted by tight locations. They are not normally as economical as Truck and Trailers on large volume (clean fill), long haul cartage. They are able to carry most types of materials.

3. Large (Tandem drive Vehicles and tipping trailer with 22m³ capacity)

The large Truck and Trailer are principally used on large volume, long haul cartage. They need bigger areas than other trucks for turning and tipping.

DUMP TRUCKS



Primarily an off road vehicle used primarily in the quarry and mining industries.

Locally used in large volume off road cartage such as Dams, Marina's and Tips. Articulated models which offer greater maneuverability are also available.

WATER CARTS



Water Carts are primarily used in Road Construction to maintain adequate water content in rock for compaction purposes. Also used in Dust Suppression, Tree/Lawn watering in areas where mains water not available and as Street Flushers.

The majority of Water Carts are Trucks with Water Tanks mounted; the remainder being towed units. Unlike other Earthmoving equipment there is not the same standardisation of equipment specifications. Listed below are ranges of Water Carts with the functions you would normally find.

Small (4,500 to 6,750 litres capacity) - Water Tank fitted to Single Axle Truck, have rear mounted Dribble Bar; some fitted with Power Spray Bars.

Medium (6,750 to 9,000 litres capacity) - Usually fitted on Tandem Drive Trucks (although some may be Single Axle), with Power Spray Bars on front and rear of vehicle. Some are fitted with automatic pump in-out facility.

Large (9,000 to 18,000 litres capacity) Larger capacity on Tandem Drive Trucks, normally fitted with front and rear power Spray Bars & some have pump in-out facility.

Common Options

Fan Spray - increases water coverage

Hand Hose - for watering purposes.