The Dando Terrier drilling rig has been designed specifically for sampling and testing for geotechnical and environmental analysis.

The rig is crawler mounted for easy site access in the most arduous conditions and is simple to operate and maintain, extremely reliable and competitively priced.
Drive Sampling Mast

Rotary Mast (1.6 metre stroke)
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Introduction

The Dando Terrier drilling rig was originally designed specifically for sampling and testing of geotechnical and environmental analysis. Since then, a number of changes and modifications have been made resulting in an extremely versatile machine which can be used in several sectors of the industry.

The rig is crawler mounted for easy site access in the most arduous conditions, is simple to operate and maintain, and extremely reliable and competitively priced. The rig’s small footprint makes it perfect to track through a standard sized doorway as well as fit in the bed of most vans and pickup trucks.

Thanks to the well thought out design, the Dando Terrier has the ability to switch between rotary and drive sampling masts simply by removing locking pins and plugging in quick-release hydraulic lines. This allows the operator to easily configure the rig set-up to suit the line of work in mind.

On rough terrain the deck can also be angled up to 30 degrees to assist in levelling the drilling mast.

The Terrier is very simple to maintain as the hydraulic system and engine are used to drive the tracks and all mast operations with rugged gear pumps and motors.
Transportation

Due to its small size and relative lightweight, the Dando Terrier is very simple to move between sites and small enough to fit into a van, trailer or large pickup truck. There are on-board racks to hold tooling & the unit is self-propelled on rubber tracks for movement to and from site. Support costs and requirements are low.

Examples of Terrier transportation

A rotary Dando Terrier tracking across an open site in the South African desert
Percussion/ Drive Sampling Mast

The Terrier percussion mast is used for undisturbed sampling and many standardised sampling/probing techniques including SPT, U4(U100) and dynamic probing. It also has the capability to drive in a duplex casing and sampling system from 143mm down to 74mm OD casing. This type of percussive drilling is generally used for soft to medium ground conditions.

The mast operates by automatically raising and dropping a large weight repeatedly on an anvil which drives the tooling into the ground. The weight is normally 63.5kg for SPT but a top section can be removed, making it a 50kg for other tests such as heavy dynamic probing. An anvil bracket adaptor can also be supplied to reduce the drop-fall from 750mm to 500mm.

A hydraulic cylinder is fitted to raise and lower the whole mast structure and is also used to extract the tooling & casing from the borehole once the desired depth has been reached.

The percussive mast can be completely removed from the rig and operated remotely (30 metre distance) for use in tight areas with an optional kit. There is also a rotary concrete coring attachment for making openings in hard surfaces to allow access to the virgin ground below.
Specification

**Drop Hammer**
Two-piece drop hammer runs on two guide bars. The weight is fully guarded and can be quickly changed for either SPT or dynamic probing standards.

- Trip Hammer Speed: 0-50 blows per minute
- Trip Hammer Drop: 500mm - 750mm
- Trip Hammer Weight: 50kgs or 63.5 kg

**Drill Mast Assembly**
Fabricated welded steel box section construction, hinge pin mounted to main superstructure, hydraulically raised and lowered.

- Overall height: 2.4m - 2.85m
- Pulldown capacity: 1000 kgf
- Pullback capacity: 7000 kgf
- Width: 600mm (including wheels)

**Carrier**
Purpose built crawler chassis with rubber tracks fitted with tilt mechanism to allow rig to operate vertically on slopes inclined up to 30° from horizontal.

- Crawler width: 800mm
- Overall length mast down: 2.70 m
- Overall height mast down: 1.50 m
- Total weight: 1300 kg
Drive Sampling Tooling

Drive Rods

In order to drive a samplers or DP probe into the ground, the Terrier uses solid 1m rods to connect tools to the drive head. The image on the left shows dynamic probe rods which are marked at 100mm intervals. The rods to the right are standard general purpose SPT/Drive rods.

Drive Sampler

Windowless Sampler

Drive samplers come in many lengths and diameters, Dando can supply most options, but typically they are 1m long. The standard sampler diameters are:

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<th>Sample Size</th>
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<tr>
<td>131mm</td>
<td>114mm</td>
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<tr>
<td>116mm</td>
<td>100mm</td>
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<tr>
<td>101mm</td>
<td>85mm</td>
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<tr>
<td>86mm</td>
<td>73mm</td>
</tr>
<tr>
<td>76mm</td>
<td>63mm</td>
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<tr>
<td>66mm</td>
<td>53mm</td>
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Samplers are generally used to produce high quality undisturbed samples in soft to medium conditions in both consolidated and unconsolidated geology.
In addition to the sample barrels, removable plastic liners can be installed within the sample tube itself. These aid sample presentation and allow easy transportation. If drilling in unconsolidated ground, a basket catcher can be added to help retain the sample within the liner.

Sample shows a small area of grass leading into ground clays

Liners with end-caps ready for transit to a laboratory for further analysis. Top white section is salt leading into loose graded rock and soils
Duplex Rods

**A complete Dando Terrier sampler with casing**

Another benefit of the drive sampling system is the ability to case the hole as you sample. As well as saving time, this is very useful in soft ground conditions as it prevents the hole from collapsing when drilling deeper.

Various sizes are available which correspond with the selected sampler size and start from 143mm down to 74mm OD.

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**SPT/ CPT/ Dynamic Sampling & Probing**

Examples of SPT Samples

Standard Penetration Tests (SPT) and Cone Penetration Tests (CPT) consist of driving standard sized samplers and probes with a set number of blows to allow an accurate measurement of soil resistance and quality.
Example of a standard dynamic probe setup

Top Image: Super heavy and heavy recoverable cone.

Bottom Image: Example of a sacrificial cone, adaptor and coupler
Concrete Coring Head

As a bolt-on option, Dando can also supply a concrete coring head assembly which fits directly to the percussive mast assembly. The head will see 245rpm and torque of about 155Nm (114lb/ft). We are able to offer different sized diamond bits, though most clients prefer a 142mm or 152mm outside diameter.

Water flush is applied using gravity feed.
Rotary Mast

A rotary Terrier working in London looking for un-exploded bombs

Driven by a hydraulic motor fitted with a two speed 1:1 & 7:1 ratio gearbox with manual gear change providing full controlled power and rotational speeds in forward or reverse with integral side inlet water swivel. BW Rod connection fitted to travelling carriage plate with bolts.

Specification

**High Range**
Maximum Torque: 155.6 ft/lbs 211 Nm
Maximum Spindle Speed: 360 r.p.m.

**Low Range**
Maximum Torque: 1089 ft/lbs 1477 Nm
Maximum Spindle Speed: 70 r.p.m.

The rotary mast is offered in two stroke lengths: standard 1.6m stroke and extended 2.2m stroke.

The latest 2.2m stroke option being tested in the Dando workshop
Rotary Mast Tooling
Augers

Solid Flight Augers

The Terrier can use the solid flight auger for general purpose soil sampling and is an economical way of drilling a hole through soft consolidated ground.

Hollow Stem Augers

The hollow stem auger is a more accurate way of soil sampling where hollow continuous flight augers are drilled into the ground together with removable centre rods and pilot bit. The hollow augers act as simultaneous casing and the hole can be advanced without the introduction of drilling fluids. The pilot bit and centre rods can be removed to give access to the bottom of the hole for various geotechnical and environmental sampling methods. The Terrier can use these augers up to 5-5/8” OD (2-1/4” ID)
Coring

A T2-101 double-tube core barrel and outer tube wrench after taking a core sample at 22 meters.

Using the high rotary speed application and the side inlet swivel - the Terrier is ideally suited to drilling with a conventional coring barrel air or water flush. Core bit sizes 101mm, 86mm and 76mm can be used running a 1m barrel or 1.5m barrel and plastic liners can be used for soft friable ground conditions.

Core of granite

A core of red sandstone on a core box
Down the Hole Hammer Drilling (Conventional DTH drilling)

Ideal for open hole drilling in hard ground conditions, the DTH hammer is a versatile tool capable of rapid progress in most conditions.

Using the low rotary speed application and the side inlet swivel – The Terrier can drill using a small DTH hammer up to 4-1/2” diameter. An additional air compressor will be required and can be supplied by Dando or sourced locally.

Most customers have, in the past, used a 3” DTH Hammer with 3½” button bit.

Tricone and Drag Bits

Apart from drilling with the DTH hammer the Terrier is also capable of drilling using standard conventional tricones, drag bits and PCD bits.
Air and Water Drilling Mediums

Petrol driven Honda water pump
A crew drilling with water and DandoPolymer drilling fluid

Because of the side inlet swivel mounted water swivel, the Terrier can be used for mud/water flush and air drilling. Dando supply a high quality petrol driven Honda pump as shown above on the left image.

A Dando Terrier 2.3m stroke rotary attachment drilling in Latin America with a hammer using a 320cfm compressor.