

# Beachcombing with the Minelab X-Terra 705

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I love the sound of my mate's "big diesel" when it's carrying us off somewhere, to detect. So it was on a particularly sunny Sunday morning as we raced over the Welsh border to visit our neighbour's shoreline – my friend with his French Deus and me with my Aussie Minelab 705. Sweeping past the magnificent castle at Conway, we were heading to some unfamiliar beaches that he had observed earlier from a distance, while driving home after a holiday in Wales.

Apparently, he had noticed that stones were showing on coastal stretches previously covered by sand, and it was these exposed areas that we were going to investigate. They were new in the sense that we hadn't detected there before. Despite the timing being poor regarding the tides, hopes were high that these would at least offer us an opportunity to search. In our coastal location beach detecting supplements the loss of access to fields filled with crops.

After an hour or so of motoring, we arrived at the first of our two venues. The sight of the water must do things to "Deus man" for he immediately declared that it was time for a cup of coffee. Pity he'd forgotten his flask! My offer to share my hot water and tea-bag was grate-

fully accepted, but having only one cup meant he would have to briefly wait. Wait? He doesn't know the meaning of the word, and to prove it he emptied out his booty box and declared that he would have his tea in that! He has such savoir faire.

After our thirsts were duly quenched, we headed onto the beach.

Two burps and he was off along the beach like an Apollo astronaut landing on a planet paved with gold. What did he know about this place that belied the scene presented to me? From the small car park one immediately stepped onto a ramp of large stones obviously dumped there by the winter's storms and offering little prospects. Lower down the slope there was a stretch of smaller stones and shallow pools, separated from the incoming tide by a sandbank. Stuart chose to work the higher strip of sand in front of the dunes further along the beach, while I volunteered to explore the lower section of the shoreline...the strategy being that hopefully between us we might be able to discover a productive area as a focus for our efforts.

Cuffing the detector onto my arm I fired up the Minelab 705. It felt really comfortable, both in terms of balance and weight. That results from combining the electronics and batteries into a slim control pod, set on the hand-grip. This

arrangement acts as an effective counter-poise to the neat 9 inch search head.

I deliberately chose to use the Minelab today because I needed the opportunity to test its capabilities in conditions that might differ from my local benign beach. What was visually evident before me certainly met that criteria.

The 705 with its several searching modes cover all aspects of metal detecting, from the gold fields of Australia to the ploughed fields of Britain. Now it was the turn of the Welsh beaches. The versatile X-Terra 705 detector is exemplified by its unique "mix and match" capabilities to tackle any task, and today my choice was the 7.5kHz frequency, 9 inch diameter concentric coil.

Minelab provide a choice of search head sizes, configurations, and operational frequencies. No matter which search head you choose for the job, you are guaranteed optimum performance. Each search head is individually tuned to peak performance at its designated frequency. These search coils also feature the latest electronic technology for processing the signals. That is done by micro circuitry, right there in the "head". This greatly improves the signal to noise ratio, and hence the "front end" sensitivity, resulting in extra depth when compared to similarly sized heads.

Minelab call the method, "V-Flex" technology, an acronym that I've personally translated as representing "Very

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Test matrix	9" Concentric @ 18.5 kHz		9"x 5" Elliptical @ 18.5 kHz	
	GB Mode SOIL	GB Mode BEACH	GB Mode SOIL	GB Mode BEACH
Clay soil	31	3	28	2
Fe patch	24	2	19	1
Wet sand	28	39	27	42

  

Test matrix	10" Double D @ 7.5 kHz		9" Concentric @ 7.5 kHz	
	GB Mode SOIL	GB Mode BEACH	GB Mode SOIL	GB Mode BEACH
Clay soil	25	3	21	2
Fe patch	17	1	19	1
Wet sand	23	37	25	26

Flexible" technology. We are told that the components involved are typical of those used in the modern cell phones. That means low power consumption, low noise working and miniaturisation, all typical of your personal mobile phone's attributes.

One thing is certain; it works, and produces a very stable detector, all powered by four rechargeable AA batteries tucked neatly into the control pod. This detector shares some similarities to the Deus in the sense that electronic processing takes place within the search head housing. One obvious difference is that Minilab's 705 has for good practical reasons retained the cable connecting the head to controls box. That direct link was deliberately chosen, rather than wireless transmission, to ensure continued functionality even when the search head is immersed in water. If you are a gold prospector or a beach detectorist, you need that submersible search head capability, to be able to hunt streams, pools or surf.

Having reached my chosen spot on the beach I noticed that the stones and water were principally on clay and not sand. First job then was to ground balance. It is a basic procedure but even so, worthy of a little forethought. The 705 being a "universal" machine, gives you two choices of ground balance. The default factory setting is for soil, but for wet sand searching it must be changed to Beach mode. I was curious as to how the 705's ground balancing circuitry would "see" this present mix, for here we had a complex matrix of clay and salt water pools, with both embedded and overlaying loose stones, some of which looked to be of the magnetic variety. How would

my Minelab handle that? Out of curiosity, I decided to take ground balance readings using "Soil" then "Beach" GB.

In either mode, the numerical range is 0 to 90. The default "soil" mode caters for the variations of geology and chemistry found on the land, including brackish water.

Such stagnant water found on land is indeed conductive, but not usually to the same degree as salty water. "Beach" mode focuses on that part of the spectrum embracing the salty water and ferro minerals. So the narrow coverage is therefore expanded when spread over the 0 to 90 in Beach mode. That in turn affords better resolution and causes faster ground tracking than Soil GB. If those assumptions are correct then there will be no direct numerical relationship between Soil and Beach mode GB numbers.

Initially with the ground balance in its default mode which is for Soil, I took an auto GB reading, and it was a steady 1. Next, switching to Beach mode by holding down the GB pad for three seconds, I then auto ground balanced again to produced a figure of approximately 28. So Beach mode was appropriate, even though the value here was noticeably low compared to the sandy beaches in my home locality. The beach at home is stone free and made up generally of deep sand, and depending on dampness, comes in between 50 and 70. In this North Wales complex situation I suspect that 28 was a reflection of the standing salt water and mineralised stones. So I began my search in Beach mode. That simple experiment warned me to be wary of leaving my detector in the wrong GB mode.

With this in mind the best practice is to turn off Beach mode and return the detector to its default of soil mode when you have finished with it. Otherwise on land ground balance and functional accuracy will be compromised if the detector is accidentally left it in Beach mode.

I've included a brief table (see above) of some GB figures obtained later, when measuring the response of four types of search-head, involving two different frequencies, over three alternative ground matrixes.

1. Garden clay soil.
2. Strongly mineralised Fe test patch.
3. My local wet sandy beach area, with "dirty" sub strata.

If you should accidentally leave your machine in Beach mode while on land it would still ground balance, but in mineralised soil this would probably cause loss of accuracy for tracking and VDI, hence poor discrimination.

Mindful of the manual's advice I kept my sensitivity relatively low at 18 (30 max).

This was three higher than recommended, but my choice was due to the fact I was sweeping well above the surface to avoid the larger protruding stones. Despite my best endeavours during the first hour, I didn't find any gold. The effort needed to work my shovel through stones embedded in clay was a wrist-wrecking exercise. The resulting low finds rate was no reflection on the detector, but rather an indication of tough conditions and a lack of desirable targets. At least I tried, whereas my mate wouldn't even contemplate wasting his time putting the Deus over such salt water situations. Within that period I'd



managed a few copper coins, plus various non-ferrous oddments. See in the illustration the two non-ferrous items encrusted with iron, testament to the X-Terra's 7.5kHz concentric coil and the control box's electronic capabilities. The Minelab 705 repeatedly demonstrated that it is no slouch when it comes to fast recovery either, for I did find a ring in all of that mess. Alas it was a cheap imitation gold wedding ring typically worn by the poor folk of the early 1900s. Basically it was a copper band plated with gold, some of which was still evident on my find.

Later I headed back up the beach, hopefully to a more productive sandy stretch. Once there, a quick GB check showed the 705's automatic GB tracking was working well for the reading was now 65 for the wind blown sand in front of the dunes. A simple press of the key-pad with the "damped-sine wave" symbol on it instantly toggles the Auto Ground tracking on or off, and that status is indicated by the absence or presence of the same symbol on the screen.

I recommend that you follow the good advice given in the handbook regarding Auto Tracking, especially in Beach mode. I switched tracking off when examining a target, to avoid the system "tuning it out". The Beach mode auto tracks twice as rapidly as it does in Soil mode, so beware.

Should you wish to know the current ground value, just press the GB pad.

Revert back to detecting by pressing the Detect-Pinpoint pad.

I eventually caught up with Stu as he worked his way up the slopes of the dunes. Here it was relatively quiet target-

wise, so I upped the sensitivity to about 28. That initially did incur some external EMI, possibly from the Deus. So by pressing the "noise channel" search button and then invoking automatic search via the additional pressing of the "C&T" pad, the system scanned its frequency spectrum and auto changed the setting to channel 1. Thereafter the detector remained reassuringly stable as I too began working along the face of the dunes. Soon I got my first signal in this location. It was strong and consistent at a VDI of 30. I noticed also that the depth indication arrows were maximised.

I had to dig into the damp interior of the sand face to a depth of about one and a half feet before the target came out of the "cave". It turned out to be a thin bracelet with a simple ornamental design profile. The band showed some evidence of gold plating. I was chuffed at the 705's efficient reporting at that distance. At last, a piece of "jewellery"!

I eventually caught up with Stu to show him my few finds and swap opinions on our progress. He had recovered several coins and other paraphernalia from hereabout, and reported that the Deus was performing well, but had recovered nothing worthy of getting the local archaeologists out of bed for. I explained how poor the situation was where I had been searching, and was hoping to improve my finds rate now that I'd joined him on "easy street". I noticed that his prior digging into the banks of sand was occasionally producing black soil.

Curious, and mindful of the depth the bracelet was at, further exploratory probing brought broken crockery tumbling out from what actually was an ash-like



fill. I continued digging out, then scanning the spoil heaps and noticed that their GB was now in the 50s! One of the plate fragments bore the initials "C.C." and when I showed it to Stu his encyclopaedic brain went into "Time Team" mode, proclaiming that we may have uncovered a dumping spot for the early 1900s local Conway army camp.

Later research on the Web proved him to be spot-on with his assessment. His finds of metallic pieces were consistent with the paraphernalia of army life, including a badge, mounting back plates, even a handsome "art deco" brass light switch! Don't mock that, for it was a good find! Similar ones sell for at least £20 on E-Bay. We concluded our episode at this location in a happier frame of mind, even though we'd not found any mandatory hammered coins or Viking gold. We weren't bothered by that, for the weather was simply fabulous and just

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being out detecting in such a beautiful environment was a reward in itself.

The Minelab 705 was functionally behaving very smoothly now, despite its earlier performance involving some chirpy "false signals". I did dig some of those signals when they were locatable in pinpoint mode, only to find they were deep wet ferrous targets. It was only later in the day at the second location that I realised why such iron was troublesome. It was because I had removed the default rejection at VDI 46/48 which caters for suppressing "phase wrap" effects often caused by deep iron. Earlier in the week I had cleared it out while experimenting, and subsequently failed to restore it back to normal.

Anyone who owns an X-Terra 705 should endeavour to exploit the several modes of detecting available other than the obvious Coin-discrimination modes. These alternate methods are normally those used by the gold nugget hunters of Australia, etc.

Granted, such modes are intended for "all metal" prospecting, but "oh boy" can the 705 cut through mineralisation to tell you that a metal target exists.

In this case, the name of the game isn't "depth", but rather "armour piercing", where armour is a euphemism for severe Fe mineralisation.

I conducted an experiment using Prospecting mode to locate a coin hidden only 2 inches deep in very severe mineralisation. In C&T Disc/All Metal combinations, the 2p copper penny coin was undetectable, even at 2 inches. Switching the 705 into Prospecting mode I could raise the search-head several inches and easily locate the coin!

My thoughts are of whether any of the more astute British detectorists will be adventurous enough to adapt the 705's functionalities for use on those UK sites where contamination thwarts normal detecting practices?

The really experienced guys usually hunt with minimum or zero discrimination, and rely on their well trained hearing to recognise the signals that others can't assimilate. The 705 was certainly made for such experts. All Metal mode with VDI for moderate mineralisation, or Prospecting mode and VCO tone for severe conditions, both offer opportunities for the "audiophile" to excel. There are people who for years have specialised in developing their audio acuties while using Pulse Induction, and so reaped the benefits. To them, this unit offers the best opportunities to practice their skills, as well as those acquired using conventional modes.

One day in the future, given the time and a "worked out" good location, I intend to grid off a section and using Prospecting mode, peg every signal and add simple marker notes.

Then just dig them up and assess the results. For that exercise I will probably use the 10 inch DD. Minelab produce several search heads sizes in concentric or elliptical shapes and involve three different frequencies: 3kHz, 7.5kHz and 18.5kHz.

My favourites for long spells of field work are the two 9 inch concentric coils, operating at 7.5kHz and 18.5kHz. In situations involving stubble, there is only one coil for me, and that's the 18.5kHz elliptical. Apart from static tests, I haven't had the opportunity to field trial the 10 inch 7.5kHz DD. It is noticeably heavier than the other mentioned coils, but come the autumn, and a chance to visit Norfolk's notorious mineralised areas, and then it will have its day.

I put the 18.5kHz elliptical on the other day and searched the local sand dunes after a sunny weekend. The 705 at that frequency was like a magnet to the cupro-nickel coins.

On that occasion I must admit that I wasn't too pleased with the target audio response while searching what looked like "clean" sand.

I had moved from searching the damp beach into the dry dunes. I expected a bit of audio degradation over the wet beach, but not in the dry clean sand.



Realising that I wasn't using Auto GB, I re-balanced for the present ground. I expected something in the 70s for this dry clean sand, but it wasn't so. The GB system read the sand as 53! I immediately invoked an auto scan of the Noise Channels to avoid the possibility of external interference. I also slightly reduced the gain to 50% because in this situation most finds were recent and not anticipated to be deeper than several inches. Still, the GB was in the 50s.

It soon became apparent as I searched and disturbed the sand to recover targets, that the practices of lighting portable barbecues or making fires and burying the remaining charcoal litter, was presently corrupting the target's audio and adversely influencing the GB readings. The fact I was using the 18.5kHz search head in pursuit of any gold losses, compounded matters.

At this high frequency all the fragments of conductive minutiae come to life, and discrimination of trash is less efficient. The sound was "brittle", even on good targets. Pondering the situation, I decided to abandon the present C&T program with its discrimination, and change to All Metal and just two tones. Bingo! My audio was now crisp and clean. With the rapid and accurate VDI of the 705 it was easy to interpret when a coin target was located. That was for all but one, the dreaded bottle cap giving a 30 VDI. In this contaminated sand the normal 32 VDI of the £1 coin was

reduced to 30. So along with that and the odd rogue pull-tab fooling me, most recoveries were coins.

The latter episode rekindled memories of a winter rally where I was sharing a conversation with the owner of a Minelab 705 fitted with the 18kHz elliptical coil. He was the only one at that rally who had found several hammered coins, while others I'd spoken to moaned about the scarcity of finds. I distinctly remember the salient point of his conversation.

He had switched from the normal disc mode to All Metal with VDI.

I didn't own a 705 at that time, but was curious about its capabilities, for I had replaced the audio socket on a friend's earlier model X-Terra, and during subsequent testing in my garden, realised that it had great potential for use in places of severe mineralisation. Consequently, the introduction of the X-Terra 705 inspired me to have one. It is a great tool and a worthwhile addition to any detectorist's armoury. I am mindful of the old adage my dad would often quote, for he was a craftsman.

"Son, always select the right tool for the job".

So next time when I'm anticipating hunting for hammered coins using the 705, I will be hunting in All Metal with VDI, and two tones at 18.5kHz.

As Stu drove to our second venue, we discussed our morning's experiences. He was interested in my opinions on the Minelab 705, for he has bought one as

a back-up to his Deus. The conversation was about the operational aspects of the X-Terra's keyboard navigation, and the possible use of those modes other than Coin & Treasure. We both agreed that the X-Terra's balance is nigh perfect, and overall the detector is very good value for money in today's market. The 18kHz was our favourite frequency mode. I also offered the thought that some of the larger hammered coins, such as the thicker groats, were more sensitive to 7.5kHz especially when lying at depths over 6 inches, and more so as mineralisation increased.

I offered an observation regarding ground balance offset for him to experiment with. I believe that adding about five positive points to your standard offset improved the audio response of any targets laying in more mineralised situations.

Menu functions are simple and straightforward. It is the sequences to selecting the sub-functions of the key pads, which might initially prove irksome, for some have additional functionalities hidden behind the primary indication shown on each touch pad.

The solution is to spend some time practicing, and thinking logically.

For me it was the various aspects of Ground Balance.

Firstly, there are two factors common to the GB routines:-

1. Remember to ground balance in All Metal mode.

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2. Pump the search head during Auto GB as well as Manual GB routines.

Let's run through the various GB routines.

- To manually ground balance over soil.** Press AM pad.
- First observe that the unit is not in Beach Mode (no umbrella on screen).
- Press GB pad, release it and start pumping search head over clear ground.
- Then use the + and - pads, to achieve a stable tone. Done?
- Now to check GB offset, press the "Accept/Reject" pad and observe reading.
- To adjust GB offset, use the + or - pads.
- Finished? Press Detect/Pinpoint pad.
- For Automatic ground balancing over soil.** Press AM pad.
- First observe that the unit is not in Beach Mode (no umbrella on screen).
- Press GB pad, then next press C&T pad, and start pumping search head over clear ground until routine completes. (Animated screen while 705 auto balances.)
- Now to check GB offset, press the "Accept/Reject" pad, and observe reading.
- To adjust GB offset, use the + or - pads.

- M. Finished? Press Detect/Pinpoint pad.

## **To ground balance in Beach Mode over sand.** Press AM pad.

1. Press and release the GB pad to enter routine.
2. Press it again and hold it, until the beach umbrella symbol appears on the screen.

Then follow either of the GB procedures previously listed, as required.

## **To revert from Beach to Soil GB mode or visa-versa.**

1. First press the GB pad and release it.
2. Then press it again and hold it, until audio beep confirms change.

The insistency of being in All Metal to ground balance is to utilise the GB tone to more accurately achieve your goal when manually fine tuning.

I found the easiest way to memorise these routines was to simply write them down.

It's also worth noting that there are two simple methods of restoring the 705 to its factory settings. Those routines are certainly "no brainers" to remember.

## **To restore all Menu settings to factory default levels.**

1. Switch off.
2. Hold down the Menu pad whilst switching on again.

## **To restore all program settings to factory default settings.**

1. Switch off.
2. Hold down the program 1, 2, 3, 4 pad while switching on again.

Eventually, we arrived at our second venue. It was another scenic location, characterised by weathered wooden remnants of posts, sticking up from the undulating beach of stones and sand. They looked like some past coastal erosion defences or abandoned jetty. We spent the next couple of hours exploring and searching, but despite our efforts little was found of note besides several non-ferrous items and another brass ring, typical of those children won on penny-in-the-slot machines.

Finally, as clouds gathered and evening approached, we made our way back to the motor and celebrated with a choc-bar from the nearby ice cream wagon. Thanks to Stu and the weather, for it had been a great day out, and my compliments to Minelab for a detector that makes you feel good, even when the times are as tough as they were today. I have "walked the dog" on several beaches and a few of the fields available at this time of the year. I have done the tests on this machine and know its potential, and I recommend it.

Finally, as a standard reference, I have produced the accompanying table, using modern copper and cupro-nickel coins. Note that I used the copper version of the 2p not the latest iron copper clad type.

Basically, you have three "modern" copper coins of different sizes representing targets with high conductivity. Then you have three cupro-nickel coins to represent the lower conductive ones.

They are paired in as similar a diameter size as is possible, but their thicknesses are less compatible, so bear that in mind when comparing depth figures.

Remember, a target's detectability depends on the following factors:-

1. Conductivity
2. Permeability
3. Diameter
4. Thickness
5. Applied frequency.

They were then tested in the ground, using the 9 inch concentric coils, one at 7.5kHz and the other being the 18.5kHz.

9 inch Concentric heads				Depth in		Depth in	
Coin	date	Diam	Thick	Soil @7.5kHz		Soil @18kHz	
				in air		in air	
10p	2008	24.5 mm	1.65 mm	11"	9"	12.5"	10.5"
2p	1988	25.7 mm	1.55 mm	11"	9.75"	10"	10.5"
20p	1993	21.4 mm	1.70 mm	10.5"	9"	10.5"	9.75"
1p	1988	20.3 mm	1.40 mm	10.5"	9"	9.5"	8.5"
5p	2005	18.0 mm	1.50 mm	9"	7.9"	11"	7.5"
1/2p	1971	17.0 mm	0.95 mm	9"	7.9"	9"	8.5"
9K ring	1960	23.5 mm	1*2.5 mm	10.5"	8.5"	11.5"	9.75"



For reference. The respective GB readings were 18 at 7.5kHz and 25 at 18kHz.

Program C&T. #1. Gain at 28. Audio, two tones. Speaker on.

An Edward groat was detected down to 10.5 inches, at both frequencies!

That last statement may appear contradictory to the average detectorist's

beliefs regarding best frequencies and hammered coins, but that only goes to prove the complex interplay between all of the five mentioned target factors involved.

The transition from 18kHz to 7kHz range occurs as the silver's thickness increases from 1 mm to about 1.3 mm. Add into that the conductivity and permeability (Fe

mineralisation) of the soil in which the target is buried, and you really are in a fluid frequency variation situation.

A last comment before I close this article. During these tests I noticed that when I scanned with the search coil raised about an inch off the ground, the target's response improved! TH