Microchip performance testing

Ian McBryde

INTRODUCTION

Microchips have been the trumpeted saviour of animal management and other forms of information management. However in the small animal field in particular there has been a lack of any performance criteria for the chips or the scanners until the Australian Standards were decided upon a year or so ago. The essence of those standards is that 'the (FDX-B) microchip must be able to be read by a scanner at a distance of 5cm whilst moving at a speed of up to 0.5m/sec.' The microchips included in this definition are those listed below. This is indeed a very appropriate and sensible microchip standard, selecting ISO (International Standards Organisation) 134 kHz microchips as the standard chip but including performance standards as well.

WHAT IS A SCANNER?

In essence it is 'a scanner that is able to read (FDX-A and FDX-B) microchips at a distance of no less than 5cm while moving at a speed of up to 0.5m/sec.'

SO WHERE DO WE BEGIN?

How do we test for a suitable microchip until we have a suitable scanner and vice versa?

In assessing the needs of the South Australian model it was apparent that to ascertain a suitable scanner was our first priority. To have a suitable scanner means one that will pick up all commonly implanted microchips in dogs and cats (primarily) within our state. The main chips that had been implanted were – Trovan FDX-A 128MHz, Avid FDX-A 125MHz [non-encrypted], Destron FDX-A 125MHz, ISO –134MHz – (from AEG, AVID, DESTRON and DATAMARS). These were the microchips any selected scanner had to be able to detect and as close as practically possible to the ASO performance standards. Thus for our purposes we had to assume some company responsibility and test the scanners against these chips.

Once this decision had been taken it was time to devise an appropriate experiment that would provide us with reliable data that we could comfortably make our decision on and this was done with the company now selected to do the testing.

METHOD

The first step was to determine the worst angle of reception/transmission by the scanner/microchip pairing. For this purpose several small blocks of Perspex were cut and holes drilled to hold the chips. These holes were drilled at right angles, parallel and at 45 degrees which enabled us to cover virtually all respective and relevant angles. You might ask 'why work out the worst possible angle of transmission to reception?' As we have no idea where the chips may have been implanted with respect to our scanners when we use them, we must determine the 5cm distance at 0.5m/sec to the worst possible angle we may happen across in real life.

The worst possible angle was determined to be with the microchip parallel to the long axis of the scanner. The direction of the chip did not seem to have a huge influence on the results.

Now, we had to use the chips against the scanner at variable distances and speeds. The distances chosen were starting at 1cm and increasing by a cm each time until the chip reading was determined to be a failure. A failure was classed as no read recorded in at least two of the 10 runs. Or 9/10 passes that recorded an accurate read was passed as acceptable. Each run was passed at a speed that was confirmed by the equipment. Whenever a failure occurred the battery level of the scanner was checked to be sure there was not an alternative reason for the failure. Therefore it was sometimes many more than 10 runs per speed at a set distance before the results could be confidently signed off on.

This process was repeated at each distance increase of 1cm (starting at 1cm) until a failure was reached. As was each speed checked from 0.1m/sec (ie. 10cm per second) in increases of 0.1 cm/sec until 0.5cm/sec were achieved, this process was followed for each distance as well.

In quick recap the scanners were checked against each microchip, at worst possible read angle of microchip to scanner at distances of 1, 2, 3, 4 & 5cm and further if indicated, at speeds of 0.1, 0.2, 0.3, 0.4 and 0.5 m/sec and each distance was measured at each speed until a failure was recorded. The next level was then also checked at each distance/speed to be sure that the previous measurements were not an anomaly.

We checked 8 types of microchips against 6 scanners.

A quick sum reveals that this involved a minimum number of 48 different scanner/microchip combinations at potentially more than 25 variations of speed and distance with a minimum number of 10 runs per scanning distance. 12,000 scans as a basic run, not including prior or high performers testing.

It is also worth noting that the microchips get 'hot' after being activated which makes them easier to read so a small period of time between passes was required to ensure the chip had 'cooled' and therefore less likely to give a more favourable result. So you can clearly see this is a time consuming and therefore relatively expensive exercise. The entire testing cost the Dog and Cat Management Board in excess of $64,000 to complete – however it has been very worthwhile.

DISCUSSION: -

There was only one scanner that truly passed the Australian Standards by our testing. One other scanner was passed as satisfactory, another two were useful but had limitations. Two scanners did not get close. These may have been okay to use by experienced operators, but did not meet our needs.

Some of the faults we found were: -

- consistently poor read against one or two microchips,
- poor battery level indication and failure or loss of performance well before low reading given,
- and a rapid drop-off in performance once peak battery level no longer present.

These factors are particularly important to be aware of with your own scanners as they could easily be the difference between success and failure in reading a chip. Some were rather flimsy in design and this was of concern where they may well be used in a field situation.

The results which are to be presented in full at the conference also show how important it is to be aware of the capabilities and limitations of the scanner you are using.

It is also very important to be aware that some scanners, I suspect most, are constantly undergoing revision of their functions by their companies and being upgraded – frequently under the same badge or so-called model and that these results are for those we tested at the time. There has also been some suggestion of a variation within a particular batch of scanners.

The chip to most commonly be poorly read was the Trovan 128kHz FDX-A chip. We did not believe this was a problem with the chip (due to its excellent read distance with some of the scanners), but with the ability of the scanner to collect and translate the transmitted data from the chip. It was the only brand released in Australia at the 128kHz level. I have heard some say that to 'wind-up' the response to some microchip frequencies was to lose performance in others. I cannot comment on the validity of this statement.

There was quite a difference in the performance of the ISO (134kHz) microchips which is more likely to relate to their manufacture than to the specific performance of the scanner in most cases. We did expect most scanners to read chips produced by the same company well, this is only logical for the companies to use highly compatible technology.

Another complicating factor that is thrown up every now and again is that one company has the patent for multi-scanners (ie. those that will read the two FDX-A frequencies as well as those of ISO frequency). This does not affect the purchaser of the scanner as I understand it but the manufacturer and retailers, this does not appear to be something the company is pursuing so its relevance is questionable.

RESULTS

These will be presented at the conference as the final results of the last scanner are not yet in.

ABOUT THE AUTHOR

Ian McBryde
Salisbury Highway Veterinary Clinic

Ph: 08 8258 7742
Fx: 08 8281 6406
Email: mcbryde@ozemail.com

Ian is a veterinary surgeon who graduated from Murdoch University in 1981 and is now in private practice in northern Adelaide suburbs dealing mainly with dogs and cats. His interest in animal behviour and management has developed over many years. He was the Chairman of the 1997 Urban Animal Management Local Arrangements Committee for the event held in Adelaide and has been a Board member of the Dog and Cat Management Board since 1995.