

**After weeks of visually inspecting coins we believe we can now class ourselves as experts on spotting “definite fake”. However, what about the more difficult “odd ball” coins?**

**We know that these coins would eventually need inspecting under a microscope. However before doing this we decided to capture the “electronic signature” of at least 20 coins from each year of minting.**

To help analyze our results: -

- We sorted each year into two smaller groups, depending on which way up the inscription was;
- We then marked each coin with a unique ID number, and
- Then methodically inserted each coin 10 times, first obverse facing us, then reverse facing us.

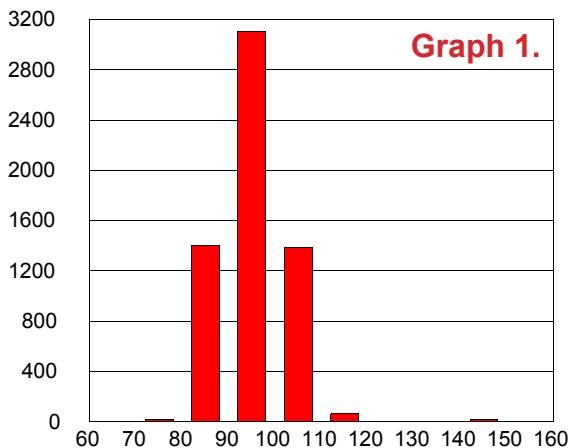
We used this method to see if the coin’s signature changed depending on: -

- The year of mintage;
- The orientation of the inscription;
- The orientation of insertion, and
- How accurate the electronic signature was.

We hoped that by comparing these results against the ones captured from the Mints genuine coin sample that we would see: -

- How goods the Mint sample was, and
- Find the upper and lower bandwidth/spread of genuine coins in circulation.

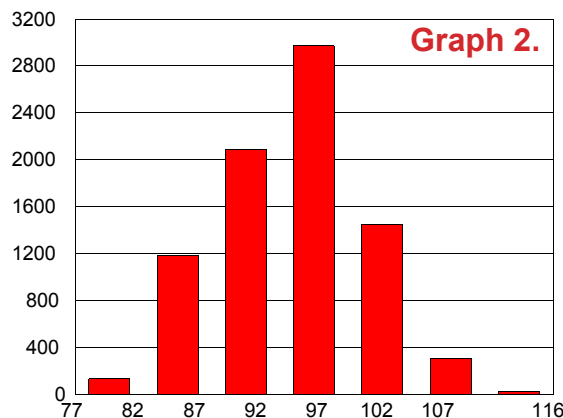
So the first thing we needed to find out was, what is the upper and lower bandwidth of genuine coins in circulation?



Graph 1, shows the electronic signature of 300 coins, each inserted 20 times to give 6000 readings.

When we compared this graph against that of the mints genuine coin sample (see fact file 0004), we see that one coin is almost defiantly a fake.

Graph 2 shows the same results but with the fake removed.



To help analyze and compare our results we use descriptive statistics such as, the minimum and maximum values, the range between the maximum and minimum values and the three averages mean, mode and median.

The following are the results from the Mints genuine coin sample: -

- Minimum value = 80
- Maximum value = 111
- The Range = 31
- The mean = 95.24
- The mode = 100, and
- The median 96.

Based on these figures we can presume that the electronic signature of a good coin should be between 80 and 111, this gives us our bandwidth.

The following results are from 300 out of the 2000 coins we collected from the bank:-

- Minimum value = 77
- Maximum value = 116
- The Range = 39
- The mean = 95.62
- The mode = 102, and
- The median 96.

When we compare the figures, we can see a small difference between the minimum and maximum values.

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- Electronic coin validators;
- Electronic change-givers;
- Cashless payment systems;
- Coin validator computer interfaces;
- Escrows;
- Hoppers;
- Anti pin systems;
- Steppers;
- Timers;
- Power supplies;
- Displays;
- Mechanical coin validators;
- Tokens.

So why is this, well it is most likely to do with the fact that we have tested a larger sample of coins or it may be that we still have fakes?

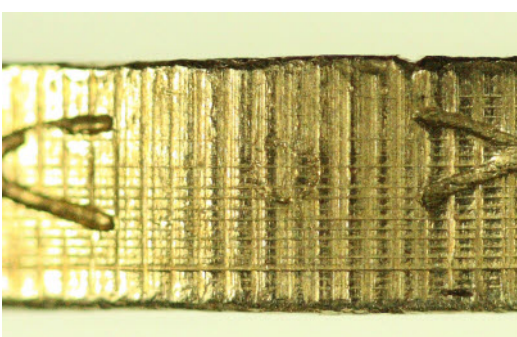


**F254**

This is the coin that we believed to be a fake because of its electronic signature.

We think that the pictures on this page prove without doubt that it is a fake.

Calibrating a coin validator is much the same. Only small samples of coins are used to generate a bandwidth. A data file then automatically adds and subtracts a tolerance factor, which allows for the wear and tear and spread of the coins in circulation.



This is the area where the dot should be.

Notice the lines running around the edge?

So as an example, we could apply the following tolerance factors to the Mints genuine coin sample bandwidth.

Their minimum value was 80, so we subtracted a tolerance factor of 5. Why 5, well the minimum value of our coin sample was 77, so to make sure we accept all the genuine coins in

circulation we subtracted a few extra points to give a minimum value of 75.

More testing would be needed to make sure these few extra points were enough.



This is a close up of the reverse design where the designers initials should be.

Also notice the pitted surface and flatness of the design.

The same is done for the maximum value. Take the Mints maximum value of 111 and add a tolerance factor of 7, this gives a maximum value of 118.

By applying these tolerance factors our confidence level of genuine coin acceptance increases. However, our rejection rate of counterfeits will decrease.

This means that we now have a coin validator that can reject 60-70% of the current known fakes.



A close up of the obverse design, where the designers initials should be.

To be continued.....

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