



Watermark

Watermarking is a technique to prevent counterfeiting by producing variations in the thickness of the paper. The watermark has sharp and spatial gradation in its image.

Foiling the Forgers

Japan's advanced anti-counterfeiting technologies are beginning to attract the attention of countries around the world.

TOSHIO MATSUBARA

JAPANESE banknotes are loaded with various anti-counterfeiting measures that can be confirmed in four different ways: by touch, by seeing against the light, by tilting and with tools.

By touch: Lines produced using intaglio printing can be confirmed by touch. In intaglio printing, the ink is raised on the paper surface. The textured feel and the ultra-fineness of the printed lines are very difficult to reproduce using regular printing and color photocopying equipment.

By seeing against the light: Watermarks can be confirmed when seen against the light. They include a portrait on the center and vertical black and white bars on the side that are not normally visible.

By tilting: Holograms and latent images can be confirmed by tilting. These measures show different images that appear when seen from different angles.

With tools: Luminescent ink and microprinting can be confirmed using tools. Lines printed using the ink become luminous when exposed to ultraviolet light. The 0.2-millimeter extremely small letters can be discerned when viewed with a magnifying glass.

In addition, other special anti-counterfeiting measures are employed to prevent the use of counterfeit notes that are produced using sophisticated digital image processing technology and/or are intended to

target cash handling machines.

These measures contribute to the extremely small number of counterfeit notes in Japan. Over the past few years, only a couple of thousand counterfeit notes have been found annually.

In Japan, banknotes are manufactured by the National Printing Bureau (NPB). Leveraging its expertise in banknote printing, NPB has been contributing to the implementation of a Japan International Cooperation Agency (JICA) project called “Strengthening Capacity of the State Bank of Vietnam in Printing Ink Production.” Based on the proj-



Hologram

When seen from different angles, the characters for the denomination “10000,” a design of “日” from “日本銀行” meaning the Bank of Japan, and the image of a cherry tree appear.

Photos: Courtesy of National Printing Bureau



1



2

ect, NPB dispatched a staff member to the State Bank of Vietnam in November 2014 as a JICA expert on a long-term basis.

Minting Coins

Coins are manufactured by the Japan Mint, which like the NPB has its own unique and advanced technologies.

A 500 yen coin (worth about 4 US dollars), for example, has four outstanding characteristics.

First, the helical ridges on the lateral side represent the world's first-ever introduction of such a processing technology in the mass-production of coins. Unlike the regular vertical ridges, a coin with helical ridges is hard to take out from a mold while pressing. It is very hard therefore to counterfeit because of the need for special technology in the mold.

Second, a latent image is inscribed on the coin which makes characters that read 500 yen and vertical bars stand out according to the angle at which the coin is held to the light. This technology is also used in other countries' coins, such as the UK's 2 pound

The Mint Museum

Operated by the Japan Mint, the Mint Museum opened in the city of Saitama, Saitama Prefecture, in October 2016, and exhibits coin manufacturing methods, machinery for adding patterns to a coin and many different types of coins and decorations. Similar exhibitions can be seen at the Japan Mint Head Office in Osaka and the Hiroshima Branch.



3

- 1 Latent image: When viewed from different angles, the set of characters reading "500 yen" on a 500-yen coin appear to stand out inside the two larger zeroes.
- 2 Micro stripes: Thinner than the width of a human hair, the stripes are applied along with the arrangements of the characters in a fan-like manner.
- 3 In 2016 Japan Mint manufactured 20-tetri coins (worth about 12 US cents) for Georgia in Eastern Europe.

Photos: Courtesy of Japan Mint

coin, but the issuance of coins with a latent image is still quite rare in the world.

A third processing technology creates a fan-like pattern of micro stripes on the surface of the coin which are thinner than the width of a human hair, while the creation of micro dots likewise requires an advanced microfabrication technology that makes these coins very difficult to counterfeit.

About 60 of the nearly 190 countries and regions around the world independently manufacture their own coins. The rest assign coin manufacturing to other countries on an as-needed basis. In 2012 the Japan Mint won a contract to manufacture 500 million 2-taka coins (worth about 1 US cent) for Bangladesh. The coins began circulating in the country in November 2013. The Japan Mint won the contract to manufacture coins for Georgia in East Europe in 2016. The Japan Mint has also manufactured memorial coins for nine different countries including Bangladesh, New Zealand and Sri Lanka.

"The beautiful coins delivered speak eloquently of the hard work done by all the people at the Japan Mint," the Bangladeshi client commented. 