



DeLaRue

Going Beyond

De La Rue Newsletter. July 2020

Introduction

July has seen new announcements about banknotes transitioning to polymer, with five issuing authorities announcing ten new denominations that will soon upgrade. The three Northern Irish issuing authorities continued their transition to polymer, with the new Danske Bank £20 and Bank of Ireland £20 banknotes entering circulation on July 20th. These SAFEGUARD® banknotes follow the Northern Irish £5 and £10 denominations in 2019 and will soon be joined by Ulster Bank £20, also announced this month.

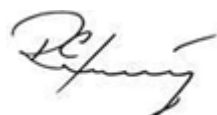
Polymer remains a crucial part of De La Rue's response to help avert the threat caused by the climate crisis. Over recent years we have evolved our thinking. Polymer reduces the end-to-end carbon footprint of a banknote during its lifecycle and central banks such as the Reserve Bank of Australia, Bank of Canada and the Bank of England considered the environmental benefits of polymer when making their decisions to transition and have published their individual studies giving insight to the data. Polymer isn't the only sustainable solution though – we continue to improve all aspects of our operations, for instance running our UK operations on 100 % renewable electricity since July 2019.

COVID-19 continues to alter the way that we work, as it does in most of the world. We've established an effective and sustainable way to operate during the crisis, maintaining operations in four countries and three continents. As a result of this we've had requests to share our knowledge about operating manufacturing facilities during the pandemic. We've enjoyed the meetings on this topic this month and have prepared a white paper, so please get in touch if you are interested in discussing this area.

In the meantime, like many of you, we have put plans in place for De La Rue "after COVID-19." We will only implement these plans when it is safe to do so and in line with all guidance. For now we continue to be available virtually and will look forward to when we can safely host visits and travel to meet again in person.

Next month our new website goes live and will make it easier for you to access information. NEXUS™ has been going through production and we hope to reveal more soon. We're also working on a new range of housenotes to showcase the upgrades and variants of our security features and SAFEGUARD® features.

If you'd like any more information on anything in this newsletter please don't hesitate to get in touch.



Ruth Euling, Managing Director, De La Rue Currency Division

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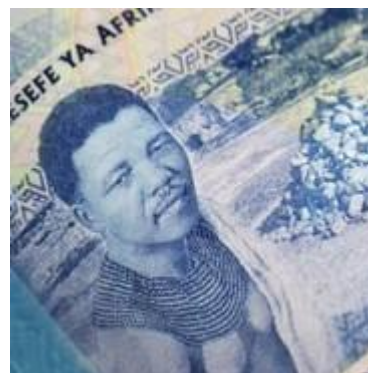
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More Than Currency



Figure 1. The Samoan 10 Tala commemorative note, celebrating Samoan youth and the sporting legacy of Samoa

For billions of people cash is the only way to pay and store value. For others it may be the only free, safe or reliable way to do so. It can symbolize freedom and independence. It also provides reassurance in times of crisis, with banknote demand having surged in many countries during the COVID-19 pandemic. Overall cash plays a vital global role as part of the payments infrastructure and possesses unique properties that other payment methods don't currently match.

Throughout the COVID-19 crisis there has been an abundance of 'experts' speculating about the decline of cash and, worse, fake news that incorrectly (and dangerously) cited the role of cash in spreading the coronavirus. Many of the anti-cash rhetoric can be traced back to individuals and companies who stand

to profit if an alternative payment method grows in popularity.

There are now many articles, news reports, central bank opinions and expert testimony stating that handling cash carries a similar risk (some even say a lower risk) to all other physical objects. These risks can be mitigated by regular handwashing as well as avoiding touching your eyes, nose and mouth. Most importantly, experts emphasise that the main way the coronavirus is spreading is by respiratory droplets (i.e. people-to-people contact).

During this time access to cash remains important for the public and for central banks. For some people it is the only way to pay. Banknotes also serve a very specific purpose. Central banks and banknote issuing authorities

can directly control the amount of cash that enters and is withdrawn from the cash cycle. The act of issuing money even generates money for the central bank, with many entirely funding the cost of their banknotes using a seignorage model.

Where numbers are published the cost associated with counterfeit banknotes is low (and significantly lower than the cost associated with other types of payment fraud). And, by ensuring physical cash is accessible, the central bank protects the citizens of its country by providing a secure and non-discriminating way to pay and store value, even in the event of a power outage or mobile network going down.

As well as the practical attributes banknotes are symbolic in being more than just currency. They portray the aspirations, traditions and culture of their users. They remind us of history and honour the people, figures, animals, plants and landmarks that are important. If the ruler of a country changes or a new country forms the event is often accompanied with new banknotes. Notable figures, country achievements and significant anniversaries are celebrated with commemorative notes.

Banknotes are often called the business card of a country. The stories behind each banknote, the people honoured, the symbolism present and the themes selected are important. For this reason some examples are shown here and more can be found by following @DeLaRuePlc on Twitter and looking for the #MoreThanCurrency hashtag.

De La Rue @DeLaRuePlc · Jul 8
 The mighty baobab tree has 6 species native to Madagascar and has appeared on several of their banknotes. One (of many) stories about the baobab says it buried its canopy in the ground, with its roots in the sky, because it was angry not to be the most beautiful tree in the world



9 23

De La Rue @DeLaRuePlc · Jul 12
 Banknotes often portray myths and legends. The Clydesdale Bank £20 shows Robert the Bruce and a spider. Robert the Bruce is said to have been inspired to go into a seventh battle, after six defeats, after seeing a spider take seven attempts to complete its web. #MoreThanCurrency



4 15

De La Rue @DeLaRuePlc · Jul 27
 Banknote security has come a long way since the the first banknotes produced by Ulster Bank over 180 years ago. Back then notes were securely transported by being cut into two parts that were separated for transport then put together again at bank premises.



Ten Pounds Sterling

10 20

De La Rue @DeLaRuePlc · Jun 23
 Did you know that Alan Turing, the father of computer science and artificial intelligence, was born 108 years ago today? He will be celebrated on the next Bank of England £50 banknote, which will complete the transition of English notes to polymer. hubs.ly/H0rQgtC0



4 24

Figure 2. #MoreThanCurrency from @DeLaRuePlc Twitter in June and July 2020

New Northern Irish £20 SAFEGUARD® Banknotes

The Bank of Ireland and Danske Bank £20 banknotes entered circulation on the 20th July, to be followed by Ulster Bank's £20 later in the year. Like the Northern Irish £5 and £10 banknotes issued in 2019 the new banknotes have upgraded to SAFEGUARD® polymer substrate. The two £20 banknotes issued this month both featured a holographic stripe in the window, with a Bank of Ireland DEPTH™ IMAGE effect and the Danske Bank holographic showing the clear DUAL™ IMAGE switching effect.



Figure 3. Front images of Danske Bank £20 (top) and Bank of Ireland £20 (bottom)



Figure 4. Close up of the DEPTH™ IMAGE holographic stripe on the Bank of Ireland £20 SAFEGUARD® banknote

In the same way as the Bank of England and the three Scottish Commercial Banks, the Northern Irish Banks continue to move to polymer to ensure that their banknotes are clean, secure and more durable than their previous paper variants. As they made this upgrade both the Bank of Ireland and Danske Bank chose to keep existing design elements to make the transition from paper to polymer notes easier for the public.

The Bank of Ireland new £20 note retains the iconic image of The Old Bushmills Distillery in County Antrim, the world's oldest licensed whiskey distillery. The Danske Bank £20 note has a similar design to the paper note featuring a portrait of County Down born inventor Harry Ferguson and the foil design is based on Belfast City Hall which has featured on the reverse of all the Danske banknotes for many years.

The notes include enhanced security features, such as a holographic stripe, a clear window which can be seen from both the front and back of the note and GEMINI™ (a print feature where one visible ink colour changes to two colours under UV light). The Danske £20 features MASK™ (a pattern that reveals numbers or letters when the banknote is held up to the light) as well as a tactile feature, on both new notes, to help the visually impaired physically identify the banknote.

Comments from Ian Sheppard, Managing Director NI, Bank of Ireland UK:

“As the largest issuer of banknotes in Northern Ireland, the unveiling of our new £20 polymer banknote is an important milestone in our history.”

“Bank of Ireland UK remains at the forefront of banknote design technology and we have committed to polymer notes because they are cleaner, more durable, more environmentally



Figure 5. Close up of the DUAL™ IMAGE holographic stripe on the Danske £20 SAFEGUARD® banknote

friendly and, with enhanced features, they are more secure than ever before. Our switch from paper to polymer for our £5, £10 and £20 notes is an example of our innovation and commitment to meeting the evolving needs of consumers."

Comments from Nicola McCleery, Danske Bank's Head of Transaction Banking:

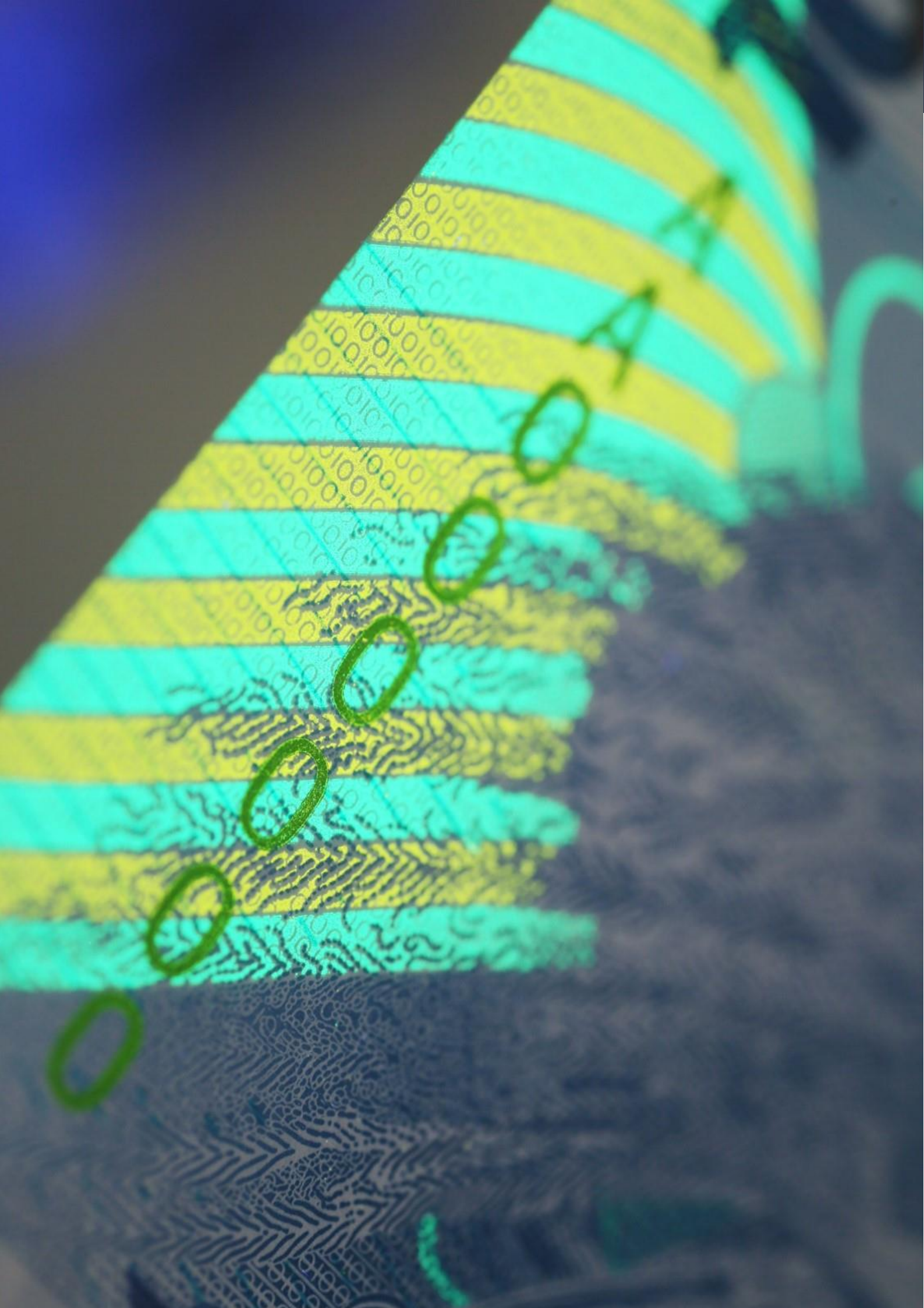
"In recent years the banking industry as a whole has been moving towards polymer notes as they are generally cleaner, harder to counterfeit and more hard-wearing than paper notes" and "NI consumers are already used to using various denominations of polymer notes, and the time is now right to complement our polymer £10 note, with this £20 note. As we've kept our design quite similar to our paper note it will be easy for consumers to recognise it."

"We are delighted to have been able to work with the Northern Irish Banks to help them continue the switch to polymer with the latest edition of the £20 note.

Comments from Ruth Euling, Managing Director, De La Rue Currency Division:

"Our design team listened carefully to our customer requirements and worked hard to ensure each note design worked together to create a family of beautiful notes for each Bank to reflect the rich and varied heritage of Northern Ireland."

De La Rue is honoured to continue working with the Northern Irish Banks to help them continue the switch to polymer.



Product Spotlight: GEMINI™

The De La Rue anti-counterfeit team examine around 2,500 Scottish and Northern Irish counterfeit notes every year. In the last 4-5 years a trend towards more counterfeits being based on UV-dull paper has emerged, suggesting that the role of UV print feature is becoming more important. In 2016 only 7% of the counterfeits examined were on UV-dull paper but that has increased to 80% in the first half of 2020. This coincides with the counterfeiters increasingly simulating the UV-printed features.

In many cases counterfeit attempts to simulate UV features are of poor quality – often hand drawn, the wrong colour or containing detail that isn't in the genuine banknotes. This suggests that the counterfeiter believes they can get away with something 'good enough.'

GEMINI™ provides a more visually intuitive UV feature that is strongly linked to the aesthetics of the banknote. It appears as one colour under normal light and instantaneously switches to two colours under UV light. It provides an easy-to-explain pattern or image under UV light, aiding retailer training and making it easy for them to remember.

This type of feature is harder to counterfeit than a basic UV ink because simulation requires two UV inks that are tightly registered to each other and specific design considerations. Registering invisible inks represents a specific challenge to the counterfeiter and intuitive images that are poorly simulated are likely to stand out.

Enhanced GEMINI™ represents the next generation of GEMINI™ design features, building up the distinctive GEMINI™ effect through small blocks, lines or microtext.

With enhanced GEMINI™ the security feature is no longer restricted to a solid area of UV ink. Instead it can be integrated into a pattern or part of an image. All enhanced variants remain registered to the visible image but now provide a much more complex image for the counterfeiter to have to replicate.

The new Royal Bank of Scotland banknotes below show examples of the type of designs possible with GEMINI™.

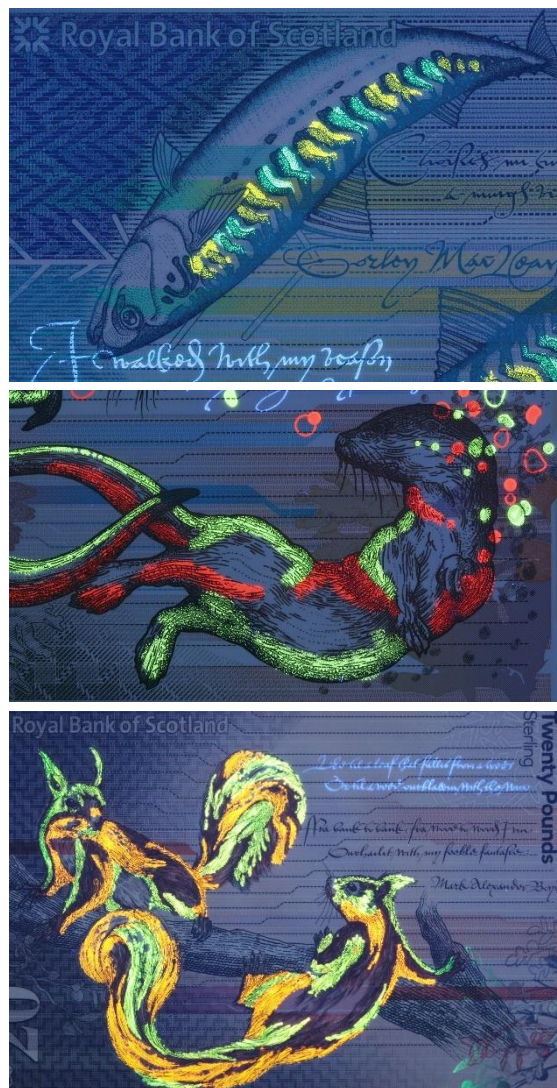


Figure 6. GEMINI™ on the Royal Bank of Scotland £5, £10 and £20 SAFEGUARD® banknotes



Figure 7. The Four GEMINI™ styles: original GEMINI™ (numbered 5), GEMINI™ Blocks (numbered 10), GEMINI™ Lines (numbered 20) and GEMINI™ Microtext (numbered 50)

The Many Elements of Banknote Security

There are many factors that determine whether a banknote security feature is effective or not. The materials used, supply chain security, designs adopted, public education approaches, machine readability, consideration of local counterfeiting threats and the way a feature wears over time all contribute to the security of a banknote. This article explores these factors in more detail.¹



Figure 8. A KINETIC STARCHROME® thread in the 100 Rupees banknote issued by the Central Bank of the Seychelles

Global banknote counterfeit rates remain low (typically measured in parts per million) and the cost linked to counterfeit banknotes is much lower than that of alternative payment fraud. The low counterfeit rates are reported across multiple banknote specifications, suggesting that banknotes are generally secure with no single “silver bullet” security feature or

substrate type. Instead security is achieved in multiple ways, layered throughout the banknote and delivered via different combinations of features.

For issuing authorities public confidence in the financial system is key for the economy so banknote issuing authorities work hard to

¹ A slight variant of this article first appeared in the July 2020 edition of Currency News with the title *Security shouldn't be breezed over*

monitor their counterfeiting threat and upgrade their banknotes when appropriate, which helps keep the rate of counterfeit banknotes low.

Polymer and paper substrates come with a good base level of security that is further enhanced in the final banknote.

With polymer, the need for polymer-specific security inks and complex window formations create new barriers to the more standard reproduction techniques. The cleaner look and smoother surface of polymer leads to security features, such as holograms, that are brighter and have stronger visual dynamic effects. These factors help explain why issuing authorities who have transitioned to polymer have reported a reduction in counterfeit levels.

Paper banknotes contain a security thread and even basic threads provide security because they are embedded in the paper (i.e. the paper forms around the thread during the paper-making process). Paper fibres can be seen where the window of thread disappears into the paper substrate and the thread is apparent throughout the entire paper when the banknote is held up to the light. Close examination of a banknote typically reveals whether the thread is truly embedded into the paper or whether simulated threads have been stuck onto a piece of paper.

Both polymer and paper substrates are manufactured in secure environments, meaning all banknotes come with a good level of basic protection from counterfeiting. Effects in the thread, layers of print features and additional machine-readable functionality, such as magnetics, then provide additional protection.

There has been a recent statement that colourshift isn't secure, which didn't mention that all threads have inherent security through being embedded in the paper. Furthermore, the

statement didn't mention that basic colourshift threads are typically available with magnetics and UV inks, providing additional machine readability and teller recognition security. Arguably the claim was too focused on one aspect of security and so the purpose of this article is to explore colourshift and security a little bit more broadly.

A good security feature is easy for the public (and others/machines) to authenticate but very difficult to replicate. It's not enough to see 'something' that changes when tilting a banknote – the public need to know precisely what to look for and so it needs to be easy to describe and remember. It is harder for counterfeiters to simulate a specific effect than a generic effect that does 'something.'

Colourshift provides a very simple and clear public education message that is easy to remember: tilt the banknote and the thread changes colour. Photocopiers, scanners and cameras will only ever capture one colour of the thread and the counterfeiter is forced to attempt to replicate a precise colour switch when attempting to simulate such a thread.

Colourshift is also incredibly durable – circulating banknotes and simulated crumple tests show that the colourshift effect remains even when the banknote is heavily worn. Issuing authorities considering a security thread upgrade should always look at how the technology performs after a crumple test and consider what it will mean for how the banknote thread will perform in circulation. If the thread effect quickly diminishes in circulation (i.e. doesn't survive a basic crumple test) then there is a question about whether investing in the effect is worth it versus another thread where the effect endures.

Another advantage of colourshift threads is that product ranges exist with very clear differentiation between the lower and higher

value denominations. Simple colourshift threads like STARCHROME® are well suited for lower banknote denominations, with high durability, a clear public education message and representing good value for money. For higher denominations, where the notes are more rigorously authenticated and the counterfeiter is incentivised to spend more effort generating good simulations, combinational technologies can complement the “family feel” of a banknote series by continuing a colourshift theme but providing a distinctly different appearance that protects the higher value banknotes.

IGNITE® has strong colourshift with additional movement effects that are precisely coupled to the colourshift. KINETIC STARCHROME® overtly combines colourshift and holographic technologies into truly unique thread designs, retaining the clear colour switching message but enhancing the security with additional

holographic effects. Both IGNITE® and KINETIC STARCHROME® threads use colourshift technology but neither would be confused with a basic colourshift thread from a lower denomination and so both help protect higher denominations from thread harvesting. This ability to differentiate and provide higher security options for higher value banknotes helps to keep banknotes secure. Where the threads used in higher denominations look like threads used in lower denominations then they are more exposed to the threat of thread harvesting.

So overall, colourshift threads remain secure and many elements should be considered when thinking about banknote security. De La Rue supplies threads based on the three main technologies (colourshift, micro-optic and holographics) and so is available to offer balanced advice and discuss this topic further.

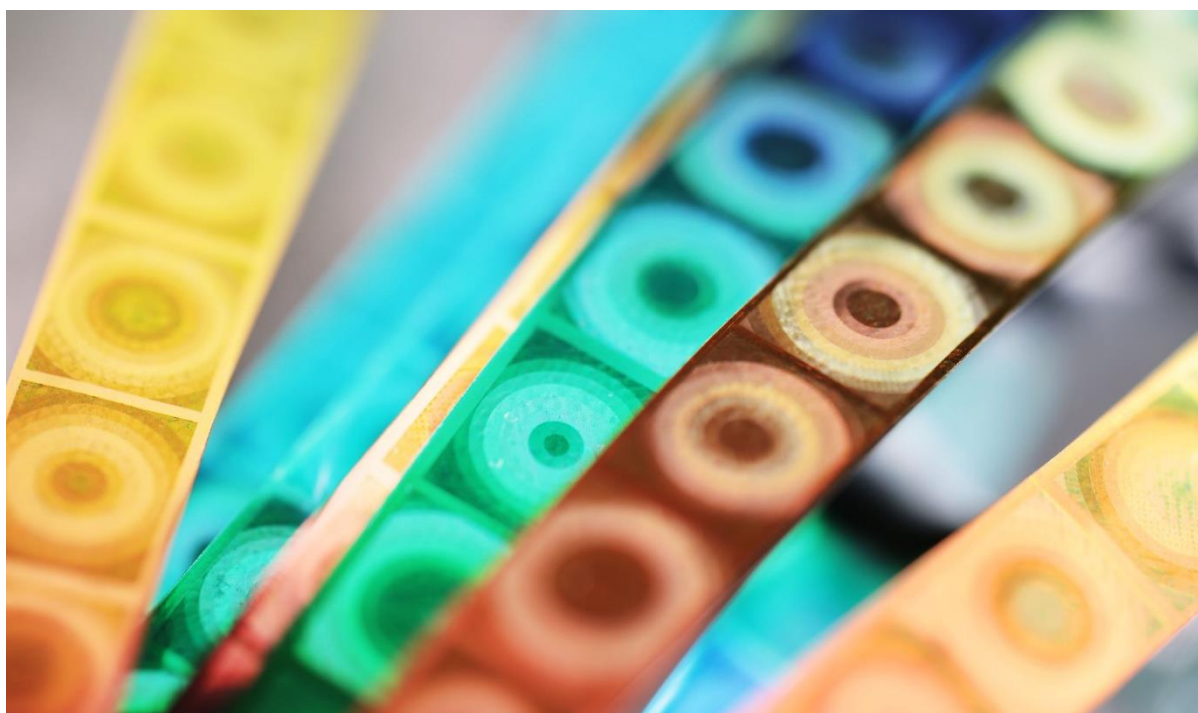


Figure 9. A sample of IGNITE® thread

Thinking Beyond Design

When it comes to designing banknotes De La Rue leads the world in translating the vision of a banknote issuing authority into a secure aesthetic masterpiece, that is designed for manufacture and functions seamlessly in circulation. Alan Newman, De La Rue's Product Director for Currency discusses the DLR Design experience for central banks and banknote issuing authorities.

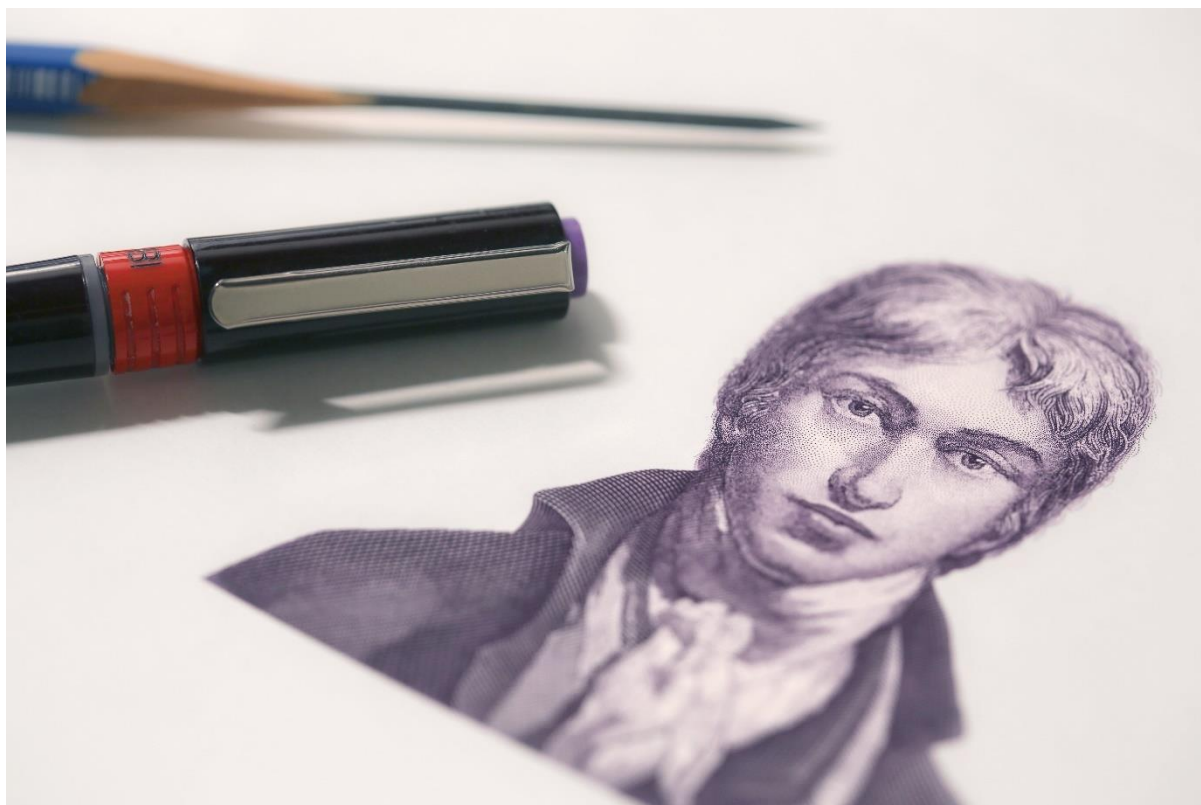


Figure 10. An illustration of JMW Turner, generated as part of the early stages of the Bank of England £20 design work

The DLR Design journey goes beyond standard design, focusing on the entire product lifecycle and obsessing on every detail to ensure the end banknote is secure, functional and one that central banks and banknote issuing authorities can be proud of.

The DLR Design approach is unique in the way it engages, supports and delivers against the needs of a central bank, fully immersing them and ensuring exactness throughout the process.

DLR Design starts the journey with insight gathering and immersion in the culture, history and the characters who are important to the

banknote issuing authority. The specification of the existing banknote series is analysed and the reasons for change are understood. Concepts are developed, perception studies are utilised, the type of counterfeit threat is understood. Cash cycle analysis is undertaken through our DLR Analytics™ platform and structured workshops are conducted with key stakeholders. By the end of this stage the durability, security and functional requirements of the banknote are fully understood and visual concepts have been developed.

The DLR Design journey has been optimized over decades with hundreds of banknote designs to ensure that the end vision is clearly

understood and that the banknote requirements have been mapped across the entire lifecycle of a banknote. It is the attention to detail and depth of thought that goes into the process that stands out, for instance ensuring the holographic birds on the Eastern Caribbean Central Bank denominations appear to be feeding out of a flower printed in gravure in the window of the SAFEGUARD® banknote.

Once the concept is developed it is turned into a high resolution, fully functional and secure banknote that is ready for production. This means considering the needs of the banknote from manufacture through to destruction. For SAFEGUARD® substrate the designs are optimised for banknote printing using knowledge and manufacturing data that De La Rue has accumulated and analysed from running multiple diverse manufacturing facilities across three continents.

Bespoke design software simulates the manufacturing tolerances and assesses risks, considering the interactions with automated elements of the cash cycle (such as ATMs and cash processing machines). This automated analysis identifies any design risk areas and enables the designs to be refined accordingly. This analysis enabled the Bank of England £20 to be adjusted to precisely match the colour of the sunset in the Fighting Temeraire painting. It has also enabled De La Rue to ensure polymer upgrades of existing paper banknotes maintain similar aesthetics where required, despite the substrates responding to ink and print processes very differently.

Finally, a functionally representative 'proof' of final banknote is produced, using materials and equipment that are mapped to the complete end-to-end manufacture process. During this prototyping stage the integrity of the aesthetic

design is verified and the functional elements of the banknote are validated. The proof is submitted to the banknote issuing authority or central bank for the final approval.

We continue to evolve our DLR design process. As a result of COVID-19, we've developed and now regularly use a high definition, interactive online process called iApprove™ this enables central bank approval of proofs without any travel being required.

The entire design journey involves managing a complex tension between artistry, creativity, technical design, cash cycle knowledge, anti-counterfeit expertise and optimised manufacturing requirements.

We are here for central banks, issuing authorities and state print works at every stage of their design journey to support the issuance of their new banknotes into circulation.



Figure 11. Alan Newman, Product Director for the Currency Division of De La Rue



£20

Bank of England
ISSUED ON DEMAND THE SUM OF TWENTY POUNDS



ENGLAND £50 BANK OF ENGLAND

July and Beyond

Notable Dates from July

July 4th

On this date in 2013 the States of Guernsey issued a £1 commemorative note to mark the 200th anniversary of the first commercial venture of Guernseyman Thomas De La Rue.



Figure 12. The Guernsey Commemorative Note

July 7th

Another central bank announces its intention to transition to polymer. The National Bank of Angola announced its new series of banknotes to be issued this year, with the 200, 500, 1000 and 2000 Kz banknotes upgrading to polymer.

July 18th

Nelson Mandela International Day was officially declared by the United Nations in 2009. On this day people across the world do something good for 67 minutes, with one minute counted for every year Mandela served his country.



Figure 13. Nelson Mandela, on a 2018 commemorative note series designed by De La Rue for his 100th birthday

July 20th

The Bank of Ireland and Danske Bank issued their new £20 notes into circulation.



Figure 14. The new Bank of Ireland £20 (top) and Danske Bank £20 (bottom) banknotes

July 24th

The Central Bank of Costa Rica announced it will soon be issuing its 2000, 5000 and 20000 colon polymer banknotes into circulation.

Next Month

The next Going Beyond Newsletter will be out towards the end of August, covering the latest De La Rue news, topical currency stories of interest, another product spotlight and a selective deep dive into areas of De La Rue currency expertise that is available to support issuing authorities and state printing works.

If you have feedback or questions please get in contact via CurrencyGlobal@DeLaRue.com



About De La Rue

De La Rue provides governments and commercial organisations with products and services that underpin the integrity of trade, personal identity and the movement of goods. Our market-leading Currency Division provides fully finished banknotes, secure polymer substrate and banknote security features to half of all central banks and banknote issuing authorities around the world.

De La Rue is the largest commercial printer of banknotes, producing up to 7 billion banknotes per year for half the issuing authorities in the world and designing a third of all banknotes in circulation. Our printing facilities are in Sri Lanka, Kenya, Malta and the UK. In Sri Lanka and Kenya the operations are joint ventures with the governments of those countries, contributing to the local economies and providing the benefits of local banknote supply.

Our global manufacturing footprint provides flexibility, contingency and decades of expertise associated with how to print a diverse range of banknotes globally. This combines with exceptional and seamless product design and delivery to ensure central banks have world-leading banknotes to be proud of.