

Canadian Banknotes

Canadian banknotes have seen dramatic changes in the last 40 years, from colour printing in the 1970's to colour-shifting ink in the 1980's to security features embedded in the notes in the 2000's. Canada's paper currency has come a long way. The most recent bank note series has arguably the most impressive innovation to date: a new polymer substrate. Polymer has allowed the Bank of Canada to stay one step ahead of counterfeiters by embedding high-tech security features right into the thin plastic film in a way that could never be done with cotton paper notes. More than 30 countries worldwide use polymer notes and this new substrate, paired with advanced security features make Canadian banknotes some of the most secure in the world. The Bank of Canada's tagline for this new note series is succinct and all-encompassing: Secure. Durable. Innovative.

Why the Change to Polymer?

The primary reason for the change in material from cotton paper to polymer is security. The Bank of Canada is constantly performing research and development, working to find the best materials, processes and anti-counterfeiting technologies to stay one step ahead of counterfeiters.

The Bank of Canada security team had to react quickly when counterfeiting soared to a new high between 2001-2004, peaking at almost 500 parts per million in 2004 (500 counterfeit notes for each million genuine notes detected in a single year). The result was that as many as one in ten retailers in 2002 refused to accept \$50 and \$100 bills. The holographic stripe was added to the currency resulting in the decline of counterfeit notes to fewer than 50 parts per million in 2010. Based on the Bank of Canada's semi-annual survey to retailers, they are pleased to learn that 99% of retailers now accept \$100 notes. Confidence has been regained by retailers, but not necessarily by the general public, many of whom still perceive \$100 bills as difficult to spend.

Security

The team who worked on the overhaul of the current Canadian banknotes consisted of a diverse group of engineers, chemists, physicists, researchers, analysts and artists. The new polymer notes took approximately five years to develop from concept to distribution, but the design work is never truly complete. The Bank of Canada recognizes that "designing banknotes is a process that never really ends" and they are already in the process of designing the next evolution of our country's currency, which will inevitably be even more secure.

According to the Royal Canadian Mounted Police's statistics concerning the printed technology used to manufacture counterfeit Canadian banknotes, there has been a steady increase in the percentage of counterfeit currency stemming from inkjet devices. From 2009 to 2012, the percentage of counterfeit banknotes stemming from inkjet devices rose from 90.3% to 97.3% (please see table below).

Table 1: The Printing Technology Used to Manufacture Counterfeit Currency in Canada

	2009	2010	2011	2012
Inkjet	90.3%	91.6%	92.9%	97.3%
Toner	9.4%	8.2%	6.4%	2.5%
Offset	0.3%	0.2%	0.7%	0.2%

The easily accessible, relatively inexpensive nature of inkjet devices, as well as their ease of use and quality improvements, are all helping to drive counterfeiting using these devices.

The Bank of Canada works with the RCMP and other stakeholders to reduce the possibility of counterfeiting through technological advancements in the banknotes. The Bank of Canada recognizes that there is a fine line between “leading edge” and “still in R&D”, so they must be realistic about the anti-counterfeiting technologies they incorporate into large-scale manufacturing efforts.

As part of the research and development process, the Bank of Canada will try to counterfeit their own notes, as well as rely on shared resources from other banking institutions around the world. Many of the security features were developed in-house at the Bank of Canada with the help of industry partners. Due to the speed of technological change and the threat of an increase in counterfeit notes, the Bank of Canada plans to issue new banknote series more frequently in the future.

The new polymer notes demonstrate an important step forward in increased anti-counterfeiting security. The security features of the new notes include detailed metallic imagery, sharper raised images, a large, clear window combining transparency and holography, transparent text and a frosted maple leaf window (look through the front of the note for a surprise!). It’s important to mention that not everything was changed from the last Canadian note series (Canadian Journey series) as security features that were effective on these notes were maintained for this series.

The Bank of Canada has been educating retailers and the public about the new security features and advising them to “feel, look and flip” the note looking for all of the features to ensure integrity.

Ink, Paper and the Production Process in Canada

The new notes’ polymer substrate is biaxial-oriented polypropylene (BOPP), which is a very durable and clear polymer substrate. The specific brand used by the Bank of Canada is called Guardian®, which is manufactured by Securrency International of Australia. Many of the security features are already embedded into the substrate when one of two printing companies (Canadian Bank Note Company Ltd. and BA International Inc.) receives the material. The initial cost of the polymer notes is approximately twice what the cotton notes cost, but with the added lifespan in circulation, as well as the fewer print runs, the Bank of Canada believes that the upfront costs are well worth the investment.

The notes are printed 45 up on a sheet and the printing processes have not changed from previous series. Lithography and intaglio are the processes of choice due to their high quality and ability to incorporate security features. Innovation on the notes comes from pairing traditional printing processes with new inks and new materials.

During the extensive testing process for the new materials, the Bank of Canada printed almost 15 million test notes before any notes were printed for circulation. That’s almost 334,000 press sheets!

Accessibility Features

The team behind this new note series has done an even better job at addressing accessibility concerns for the visually impaired than in the last series, which already had many commendable features. Large, high-contrast numbers, distinctly coloured denominations, longer lasting raised patterned dots and banknote reader codes on both ends of the bill make this the most accessible series ever. The raised patterned dots are not Braille (as research indicated that not all users read Braille) but is intended to help a broader audience correctly identify bills. They are simply raised dots that were created through consultation with visually impaired Canadians.

Environmental Impact

The Bank of Canada commissioned an environmental study to compare the cradle-to-grave environmental impacts of traditional cotton notes to polymer notes. Factors such as the energy to produce raw materials, resources required to process the substrates, as well as printing and distribution were all taken into consideration. The results showed exciting progress, whereby the polymer notes demonstrated significant environmental benefits over cotton notes, sometimes as much as a 30% improvement.

The new polymer notes will last an estimated 2.5 times longer than cotton notes, which will decrease the total number of notes required. Additionally, the polymer notes weigh less, and are therefore better for the environment to transport and distribute. New notes are recyclable and once a note is taken out of circulation, it will be shredded and converted into plastic pellets, which will then be used to make everyday plastic items like lawn furniture.

The single largest factor in determining banknote printing runs is replacing notes that are unfit for circulation. Although reducing the overall need for printing is not necessarily a positive reality for our industry, the overall innovation and lessening of the environmental impact reflects positively on the work we do in our industry.

Paper money has come a long way as printing and reproduction processes have evolved. Canada is leaps and bounds above many countries' paper currency in terms of security, innovation and accessibility. This is a proud achievement for us all.

Will physical money disappear in our lifetimes? Although possible, it's highly unlikely, because paper currency allows consumers some anonymity in purchasing that won't be tracked by banks and credit agencies. Cash is universally accepted and does not require supplementary technology to process the transaction. Using paper currency also provides us with a reminder of our Canadian history through the imagery on every denomination.

If you are interested in learning more about the history and science of our Canadian banknotes, explore the In the Money exhibit currently on at the Currency Museum in Ottawa, ON.

