

# Bank Cheque Fraud and Cheque Truncation System to Illuminate the Fraudulent Transaction: A Case Study

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## Abstract

In the prominence of the technological era, every field is being digitalized and automated to turn-around time, manual work and to add precision. One such attempt was made in the banking field with the introduction of the Cheque Truncation System (CTS). Cheque Truncation System brought uniformity and standardization the cheques being issued by the banks across the world wide with a mandatory set of security features and the authentication of the security features has been made available with automated mechanism based on image processing and pattern recognition of the bank cheques. This study presents examination of a machine generated cloned cheque. Extensive examination of questioned cheque and its original source documents in forensically reveals a unique method of forgery to clone a genuine cheque.

**Keywords:** Cheque Truncation System (CTS) • Clone cheque • Security features • Alteration

## Introduction

In the epoch of technological progress, the focus has been on digitalization and automation of banking sector so that remittance is less arduous and time consuming yet secured from end-to-end encryption. The expeditious growth of Indian economy has escalated the volume of financial transactions and banking institutions are deemed to be the paramount of this economic amplification. The customers of banking institutions are facilitated with various modes of financial transactions from the traditional funds transferring options such as cheques, demand drafts, ATMs, credit and debit cards to the new and trendy web-based banking, smart cards, mobile banking etc. for efficient and rapid transfer of funds globally. Although different ways of financial transactions have been enabled, bank cheques are being used ever since by masses whether for individual transactions or in corporate as well as private sectors. This has been alluring the fraudsters to commit cheque frauds for monetary gain.

To reckon with, multitude cheque fraud cases and automatization of cheque clearance system with safety of digitized data, an Image Based Clearing System (ICS) or Cheque Truncation System (CTS) was initiated by RBI in 2008 in India [1,2]. Truncation is a process by which the physical movement of cheque issued by a drawer were restricted by the presenting bank at some juncture en-route to the paying branch of bank [3,4]. In lieu of bank cheque its electronic image is circulated to the paying branch of bank through the clearing house along with some critical relevant information like date of presentation, data on the MICR band, presenting bank details, etc. [3,5]. This obviates the necessity of flow of banking instruments across various branches for clearing purposes, except in some unconventional circumstances. This step is cost and time efficient which ensures swift and secure clearance of cheques bringing elegance to the entire activity of cheque processing. Moreover, Cheque

Truncation System added several security features in the cheques some of which are made mandatory while others are desirable in order to transform a printed matter into a final product for which the authenticity and validity can be verified, thus, safeguarding the banking instrument and curbing the cheque frauds simultaneously [6,7]. After existence of Cheque Truncation System, the security features incorporated in bank cheques were standardized across all the banks in world wide.

Initially, the fraudsters resorted to fake, photocopied, counterfeited cheques for financial gain. They predominantly used to manipulate the handwritten areas of Amount in figures (Legal Amount Recognition) or amount in words (Courtesy Amount Recognition). Apart from that the signature of the genuine account holder is either be forged or digitally transposed for the encashment of the fraudulent cheque. Earlier these types of fake cheques were reported undetected as they were being prepared on sophisticated scanning and printing technologies. The integration of several security features and high standards of Cheque Truncation System and adoption of automated system of authentication of security features to detect the fake cheques and to abate such cheque frauds to an extent. However, the fraudsters manage to find some or the other loop holes to circumvent the security.

A new recent day's laboratories in India received number of cases in which a new trend of forgery has been observed in which the fraudsters use the genuine cheques and alter them mechanically in the printed areas of field placements i.e. Name, Account No, Branch Details, MICR details and later substitute the details of these areas with the desired ones. In this way the fraudsters prepare a cloned cheque i.e. - A similar copy of its genuine cheque bears the same details. The signatures in such cases may or may not be forged. If forged then the most typical type of signature forgery found is simulation or digitally transplanted one. During cheque clearance process, the cheque being genuine show all the security features which a genuine cheque is supposed to bear. Whereas, the alterations sometimes undergo undetected depending on where and how they are made and printing technique used after such manipulations by the fraudsters. Additionally, the scanned images of cheque, under Cheque Truncation System protocol seldom make the scrutiny of signatures and mechanical erasures restricted to an extent, thus, impending difficulty in detection of manipulation or forgery because with automated mechanism based on image processing and pattern recognition of the bank cheques by which relevant image-level features are initially extracted from cheques and then using these features an algorithm for discrimination between genuine and duplicate cheques[8]. This eventually ends in encashment of the

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tampered cheque at times. The alteration in a genuine document or producing a document appearing to comply with certain stipulations to defraud someone thus necessitates the forensic examination of documents [9].

The forensic examination in such cases relies on various tools or instruments and skills of the forensic document's examiner for rigorous scrutiny of the disputed cheque. The instrument such as high magnification microscopy unearth the traces of substitution or mechanical erasure such as ink residues of printed and handwritten matter, adhesives, evidence for other manipulations as well as traces of cutting ultimately exposing the alterations done [10]. As such for signatures, even after colossal attempts, execution of an exact identical signature of the authentic one has slight probability to be successful if a competent document examiner examines it assiduously [11]. The inherent defects in signature such as hesitation, defect in line quality, slow speed, lack of rhythm, unusual pen lifts or pauses, patching, tremors, blunt initiation and terminating strokes etc. revealed the forged signature [12,13]. Its detection depends on the skill of the forensic document's examiner. Thus, in the field of Documents examination extreme attention along with correlation is required of either all or at least a few numbers of several attributes that compose a document in order to ascertain its authenticity or fraudulent nature. In the light of such cases, it is pertinent that a cheque should not be opined to be genuine or fake at a glance or by mere presence or absence of a few characteristics, a holistic approach is indispensable.

In the present article, the authors have discussed an actual case in which a Cheque Truncation System (CTS) compliant cheque has been examined. The forensic examination of the cheque revealed marks of alteration in field placement which was undetected in automated authentication system as well as simulated forgery of signature. The alterations observed in the presented case study reveal the new trends being followed by the fraudsters lately. These types of cases have started to emerge in recent past and hence need closer understanding. The detailed analyses of the case with elaborated laboratory findings have been discussed.

## Case Presentation

The investigating agency deposited a Cheque Truncation System (CTS) compliant bank cheque to the laboratory for the verification of tendered signatures on it. This case arises when plaintiff filled a complaint with the bank by stating that someone duped with some amount from my bank account, on preliminary enquiry it comes to the notice that the fraudulent transaction was taken place by honouring of a bank Cheque issued to the Customer for the purpose, though the cheque with same number is still in the safe custody of the account holder. The investigating agency deposited, the Disputed cheque through which the fraudulently transfer of funds took place has been submitted along with the specimen and admitted genuine signature of the original account holder for the examination. The forensic examination of the disputed cheque revealed that in addition to the forged signature the disputed cheque also contain alterations in significant field placement. The cheque being genuine was complying the CTS protocol and alterations were made in such a way that it went undetected until rigorously examined by the authors in the laboratory.

## Results

The forensic examination of the disputed cheque is carried out to verify the authenticity of both the signature as a concern raised in query as well as the banking instrument as a whole to check for any signs of tampering. The instruments used for the forensic examination of the disputed cheques and standard signatures involve, hand magnifier of 10X resolution, angle poised lamp for light source and HRSC i.e. High-Resolution Spectral Comparator to provide various light sources and magnification to facilitate examination.

### Examination of disputed signature

The Disputed signature is examined under magnification and with the help of various light sources. The Disputed signature show defective line quality, blunt initial and terminal strokes, heavy pen pressure, pen stops at unusual places, drawn movement. Similarly, the standard signatures are also

examined and these signatures are found to be freely written with smooth line quality, moderate pen pressure and are consistent in terms of overall size and proportion of the letters and movement and as such these signatures form suitable basis for effective comparison and examination with disputed signature.

Apart from the class characteristics, the differences in individual handwriting characteristics with respect to letter formation are also observed such as; commencing stroke of the signature and curvature of successive strokes; execution of letter 'a'; shoulder formation of letter 'm'; the termination of letters 'u', 'm', 'a' and 'r' are flourish in standard signatures whereas in questioned signature they are blunt; nature and extent of underscore as well as its relative spacing between the overall signature which can be observed on comparing the Standard and Disputed signature as demonstrated in figure 1. Therefore, it is concluded that the Disputed signature is a forged one and produced by simulation.

### Examination of disputed cheque

The examination of the disputed cheque reveals similarities with the standards of Cheque Truncation System (CTS) which are as follows:

- **Dimensions:** The dimensions of a cheque are significant feature of a genuine cheque. On examination, the disputed cheque is found to be 202.0 mm in length and 92.0 mm in width which complies with the standards of CTS as demonstrated in figure 2.
- **Watermark:** Under transmitted light, an oval shaped watermark is revealed in the disputed cheque which reads "CTS-INDIA". The bigger and smaller diameter of oval measure to be 3.0 cm and 2.6 cm respectively as shown in figure 3. The watermark along with its measurement of diameters is found complying with the CTS protocol.
- **Security features visible under UV rays:** The UV visible security features are detected under ultra-violet or UV rays of varying wavelength. Under UV rays of 313 nm, the UV band on areas of Amount in Words or Legal Amount Recognition and Amount in Figures or Courtesy Amount Recognition can be seen fluorescing. Further, logo of Bank printed with Ultra-violet sensitive ink also fluoresces as demonstrated in figure 4. However, an oddity is also observed in UV visible bank logo which is described in the separate section.
- **Micro-lettering and others:** Under magnification, "PUNJABNATIONALBANK" is observed in micro lettering field placement . Apart from it printer's name is printed along with "CTS-

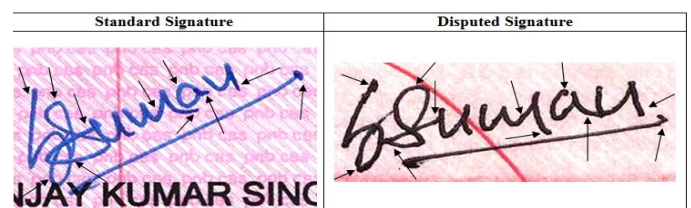


Figure 1. Comparison of standard and disputed signatures of the original bank account holder. The arrows highlight the fundamental differences in the handwriting characteristics.

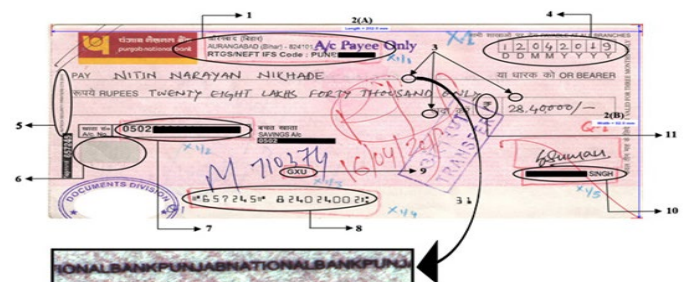
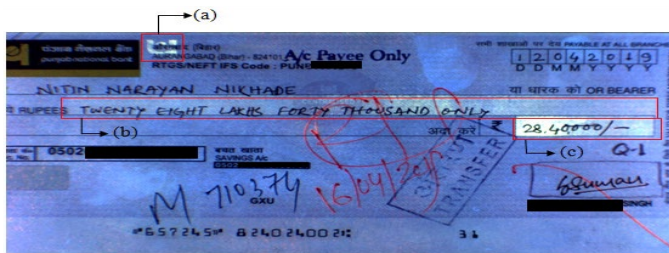


Figure 2. Demonstration of various security features enlisted by CTS-2010 standardization.



**Figure 3.** Disputed cheque under transmitted light shows the watermark of “cts-india” having the dimensions of 30.0 mm and 26.0 mm of the bigger and smaller diameter respectively.



**Figure 4.** The figure reveals the UV security features present in disputed cheque under UV rays of 313 nm wavelength.

2010” printing and new Rupee symbol is also present as demonstrated in the figure 2. Other features such as clutter free background and safety printings are also observed under high magnification.

- **VOID pantograph:** The careful examination also revealed VOID pantograph at the lower left-hand corner as depicted in the figure 2. This security feature is incorporated at the stage of printing of cheque and hence, a difficult feature to counterfeit.
- **Standard field placements:** The significant fields such as signature of drawee, account number of the drawee, amount in words, figures, payee name, date etc. are found to be present in the standardized format in the disputed cheque which are marked and explained in the figure 2.

## Discussion

The Disputed and Standard cheques are meticulously examined to verify the documents for genuineness of signature as the problem raised in query. Additionally, the disputed cheque is further examined to verify its authenticity with respect to its genuineness or for any signs of tampering. These factors remain the core of the forensic examination of the presented case. The Standards of CTS-2010 are thoroughly studied and followed to find the genuineness of the disputed cheque. The authors scrutinized every mandatory as well as optional security features mentioned in the RBI guidelines of CTS-2010 protocol along with the comparison of disputed signature with the standard signatures scientifically with the help of various instruments.

The scientific comparison of signatures on the Disputed and standard cheques unveiled that the signature on the disputed cheque is forged. The disputed signature is a product of simulation forgery in which the fraudster managed to procure the model of genuine signature of the victim and imitated it on the disputed cheque. The authors detected the inherent defects in the signature and signs of forgery which help them to reach to this conclusion such as tremors, defective line quality, blunt strokes in the initial and terminal strokes and other features which are already explained in the examination section.

A careful comparison is made between the disputed cheque and CTS-2010 standards for printing of bank cheques which unfolded that the disputed bank cheque is genuine. Yet the claim of fraudulent transaction is unerring. The reason of the substrate of the cheque being genuine and still the financial transaction asserted to be fraudulent is due to the fact that the disputed cheque

doesn't contain the victim's account details originally. The fraudulence is conducted by securing a genuine cheque and mechanically erasing its original details in significant field placements to alter them to match the victim's account details to defraud him. The alterations observed in the disputed cheque are explained as well as demonstrated through the captured images during the examination of the case. The tampering of cheque by mechanical erasures is the commonest and elusive to detect laser printer accurately transfers the image signal corresponding to the document, and the toner is melted by the fuser and pressed onto the paper with higher concentration. Toner used in printing the details of field placements adheres only on the surface of the paper and hence easily removed by any sharp object such as a scalpel. Furthermore, re-printing in the erased area makes it challenging to detect the alteration. However, diligent efforts manage to catch the manipulations in the field placements as thorough examination revealed remnants of toner particles in the significant places characterized with other features such as fibre disturbances, defect in UV logo of bank etc. as described extensively in the examination of the case.

Even after being altered at several places the cheque was complying with CTS protocol due to the fact of it being genuine and the protocol could detect all the mandatory security features in the disputed cheque to give it clearance. As for the alterations, the CTS protocol does manage to detect some of the significant manipulations, however, in this particular case the alterations are made in such a way that they are inconspicuous to be detected by the system or naked eye. It is only the rigorous examination and ratiocination which unveiled the truth.

## Conclusion

In the 21<sup>st</sup> century, with the advancement and availability of high-end printing technology and graphics editor manipulation in document forgery is become quite easy. The acquisitiveness of fraudsters is the reason of unceasing frauds in banking sector especially when it comes to cheque frauds. The lucrative financial transactions taking place through bank cheques across the nation in various sectors is intriguing for the fraudsters. The CTS-2010 was an advanced step to enhance the security of banking instruments to its utmost and to reduce the sheer workload on banking staff in cheque clearance process. To an extent, this effort from Reserve Bank of India actually paid off to curtail some of the spiteful cheque frauds. Recent days this new trend in cheque frauds were observed as discussed in this case study, where fraudsters are using genuine bank cheques and altering them with such dexterity that they manage to get clearance at times. In such cases, the burden lies on the forensic document examiner and it's his/her skilful discernment which plays key role to reveal the facts of the forensic documents cases which are not decipherable by lay man. The presented case study explained the similar trend of fraud. The forensic examination explained in detail in this paper gives an idea about the challenges of a forensic document examiner and how sometimes a case might appear lucid to the naked eye but ambiguous on a closer look. This problem is worrisome and need to be addressed. Being a Forensic Document Examiner conclude this case study with following suggestions for printing of Fields Placements on the bank cheques:

- The use of toner based printing technology need to be replaced with conventional impact printing such as letterpress printing or intaglio printing.
- The printing details be embossed by which we will get a permanent marking on the documents with requisite details.
- The field placements of the bank cheque shall be printed with an ink that fluoresces under ultra violet light in addition to having a visible color.

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## Conflict of Interest

The authors state no conflict of interest.

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