



Netherlands Forensic Institute  
*Ministry of Security and Justice*

# The Application of an Extra Paint Layer to Burglary Tools to Identify Persons Involved in Bank Robbery

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# Netherlands / NFI

## The Netherlands



Area : 41.526 km<sup>2</sup>  
 Capital : Amsterdam  
 Population : 16.5 Million

## Netherlands Forensic Institute



Nederlands Forensisch Instituut  
 Ministerie van Veiligheid en Justitie

Staff : 557\*  
 Case reports : 42.100\*  
 (\*2010)





## Case: Bank Robberies

74 bank robberies with similar *modus operandi* happened all over the Netherlands in the years 2003 - 2006





# Modus operandi





# Sledge hammer







## Sledge hammer



The 4 kg LUX sledge hammers found after bank-robberies are purchased at one particular DIY store in Amsterdam (sales 20% above average).



## A trap is set

NFI is asked by police to apply an extra paint layer to 18 brand-new Lux 4 kg sledge hammers.

Demands:

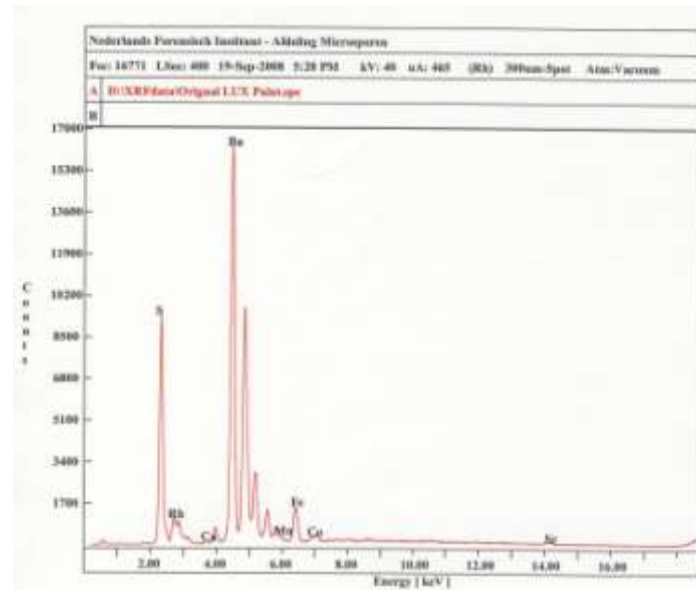
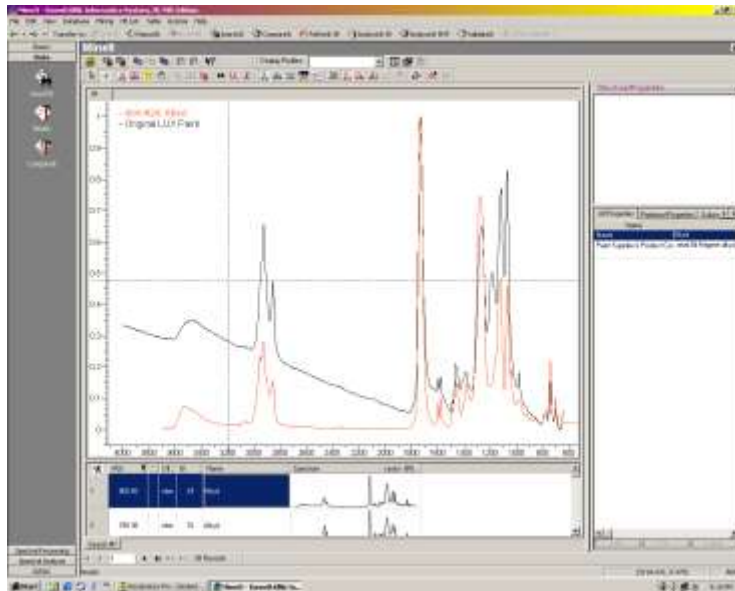
- the extra paint looks similar as original paint
- the extra paint has a unique composition
- the extra paint can be identified in the lab

The 18 repainted sledge-hammers are to be sold at the particular DIY store in Amsterdam.

Every purchase will be recorded on video-tape.



# Sledge hammer



original paint on Lux sledge hammer: alkyd with  $\text{BaSO}_4$





## Recipe for extra paint layer



Recipe:

10 ml colorless alkyd paint

1-2 teaspoons pigment

2 ml white spirit

10 ml black alkyd paint

For 18 sledge hammers, 18 different paints were created, using 18 different (combinations of) pigments



Pigment	Elements
Antimony White	Sb
Chromic Phosphate	Cr, P
Cobalt Green	Co, Zn
Bremen Green	Cu
Umber	Fe, Mn
Ultramarine Green	Cr
Zinc White	Zn
Lead Sulphate	Pb, S



## Preparing the paint





# Removal of sticker



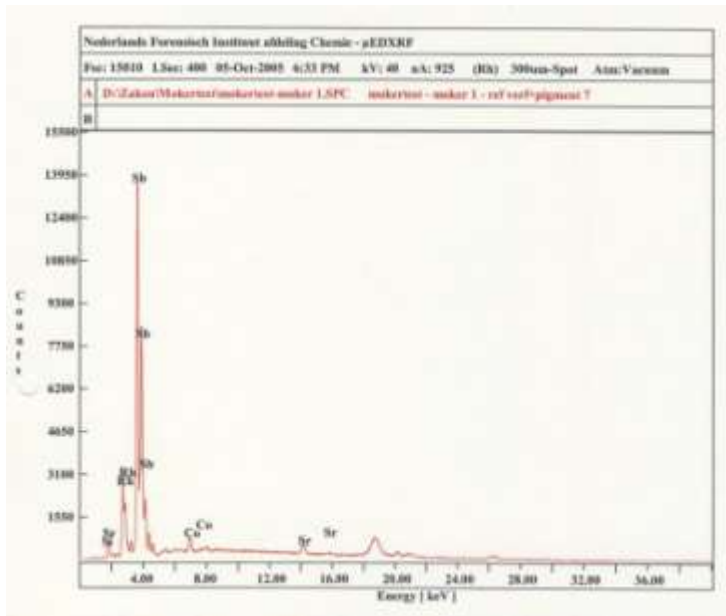


## Prepared sledge hammers

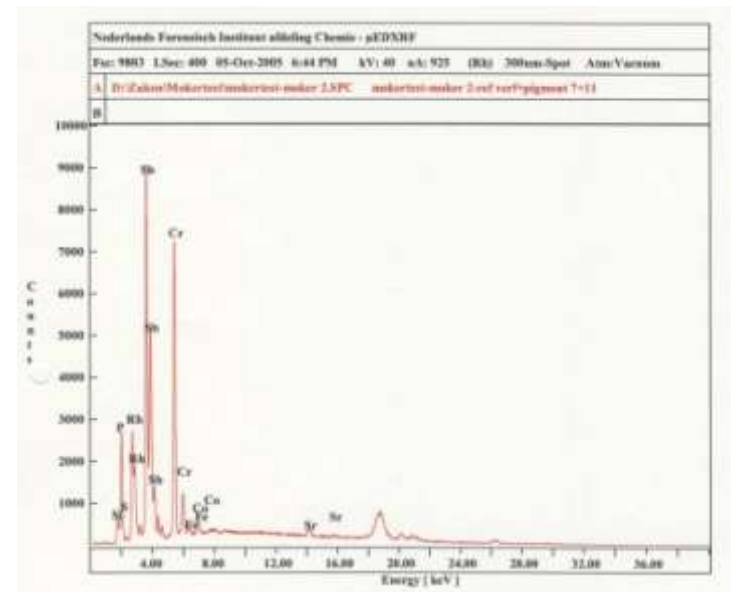




# Identification by $\mu$ -XRF



sledge hammer #1  
Antimony White



sledge hammer #2  
Antimony White +  
Chromic Phosphate



## Sledge hammers put up for sale at DIY store



- Sledge hammer in display cabinet
- Staff hands sledge hammer to customer after removing tag
- Customer takes hammer to counter
- Purchase is videotaped
- Video tape is stored under same number as the sold sledge hammer







## The trap works!

- 5 out of the 18 prepared sledge-hammers returned to the NFI as evidence after a bank-robbery.
- After  $\mu$ -XRF analysis the 5 sledge hammers were identified: hammers #6, #7, #9, #10 and #11.
- Corresponding videotapes (#6, #7, #9, #10 and #11) were analyzed by the police and ...  
... the buyers were identified, some with help of the television program 'Opsporing verzocht' (Dutch version of Crime Watch).

In this way the identified buyers could be linked to the specific bank robbery where the hammer was left behind.



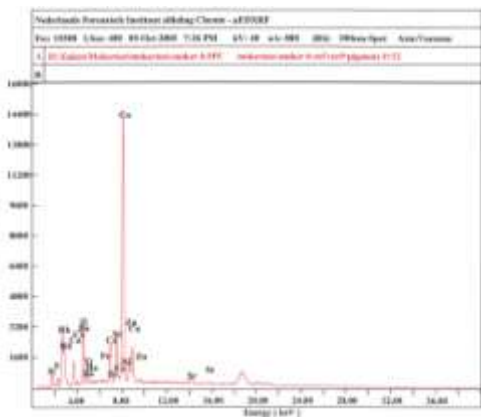
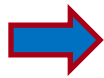
## TV-program 'Opsporing verzocht'





# The trap visualized

Bankrobbery  
in city D



μ-XRF spectrum of extra paint layer:  
**hammer #6** is identified

Videotape #6 shows **buyer of hammer #6**



## Other 'victims' of the trap



Videotape #9 shows **buyer of hammer #9**



## Other 'victims' of the trap



Videotape #11 shows **buyer of hammer #11**



## Results



- In July 2007 eight defendants went on trial for taking part in a criminal organization and for committing multiple bank robberies.
- Sentences up to 3,5 years