

Recover® Latent Fingerprint Technology, can it aid forensic casework past and present?



METROPOLITAN POLICE

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BACKGROUND

- Fingermarks observed on glassware within a related chemistry experiment at Loughborough University.
- Further research conducted to upscale work and synthesise safe to handle precursor material.
- Prototype equipment developed which showed promising results on a range of metal substrates.
- Disulfur dinitride process commercialised by Foster+Freeman Ltd as 'Recover® LFT'.
- 'Recover® LFT' required ISO17025 accreditation for operational use in the UK.
- The Metropolitan Police Service approached Dstl to help validate the process for use on knives and cartridge casings.
- Dstl undertook two studies to provide supplementary data to the Metropolitan Police Service.

PROJECT AIMS

Study 1 – Fired Cartridge Casings

- Determine the effectiveness of Recover® LFT and Superglue Fuming/BY40;
- Determine any effects of cleaning samples with warm soapy water/ethanol prior to Recover® LFT treatment.

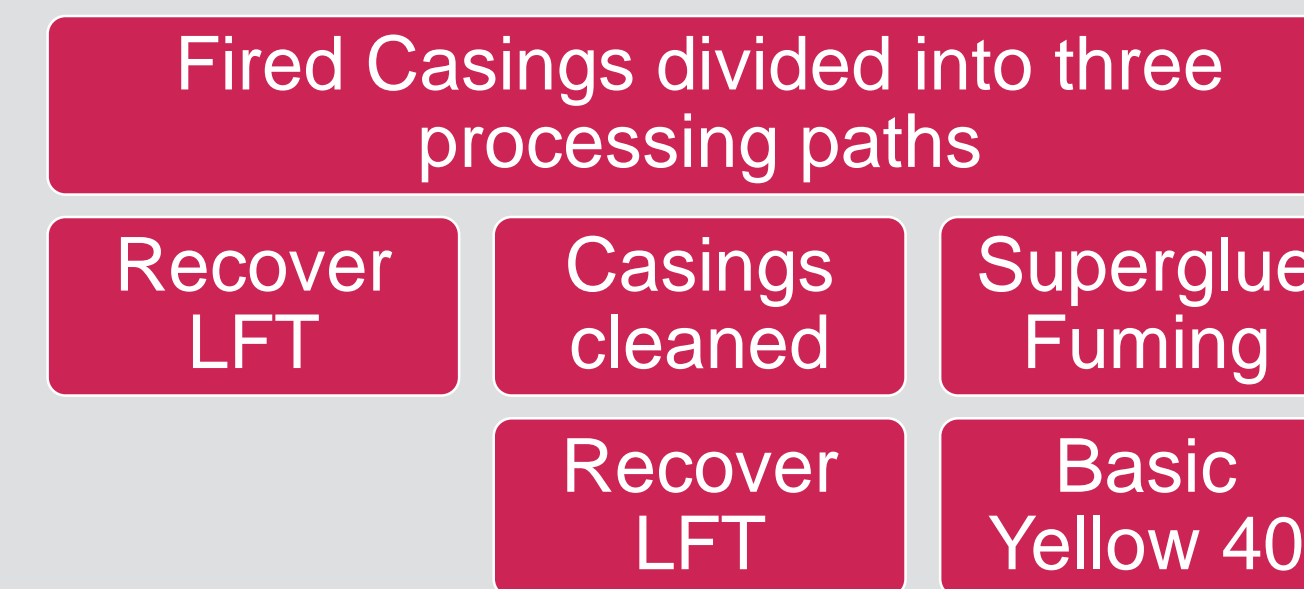
Study 2 – Stainless Steel Knife Blades

- Determine the impact of standard visualisation processes on the effectiveness of Recover® LFT;
- Determine if Recover® LFT can find extra marks after such processes;
- Determine if the chemical process residue needs removing prior to Recover® LFT treatment.

EXPERIMENTAL

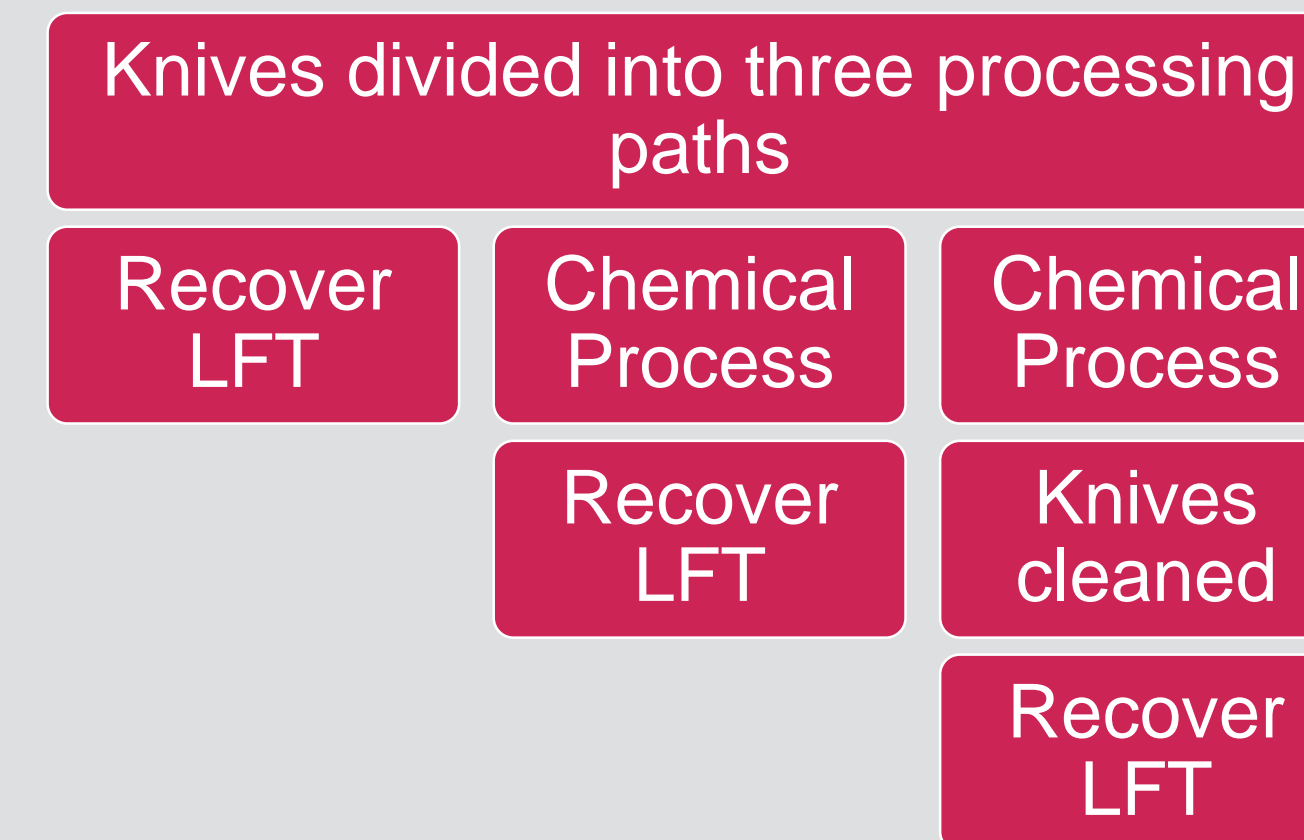
Study 1 – Fired Cartridge Casings

- 745 rounds of brass ammunition.
- 19 donors across two locations.
- Fingermarks aged for 30 minutes prior to firing.
- Grading: New 0-3 grading scheme devised to reflect the type and size of ridge detail visualised on casings. Grades 2 & 3 displayed some areas of clear, continuous ridge detail.



Study 2 – Stainless Steel Knife Blades

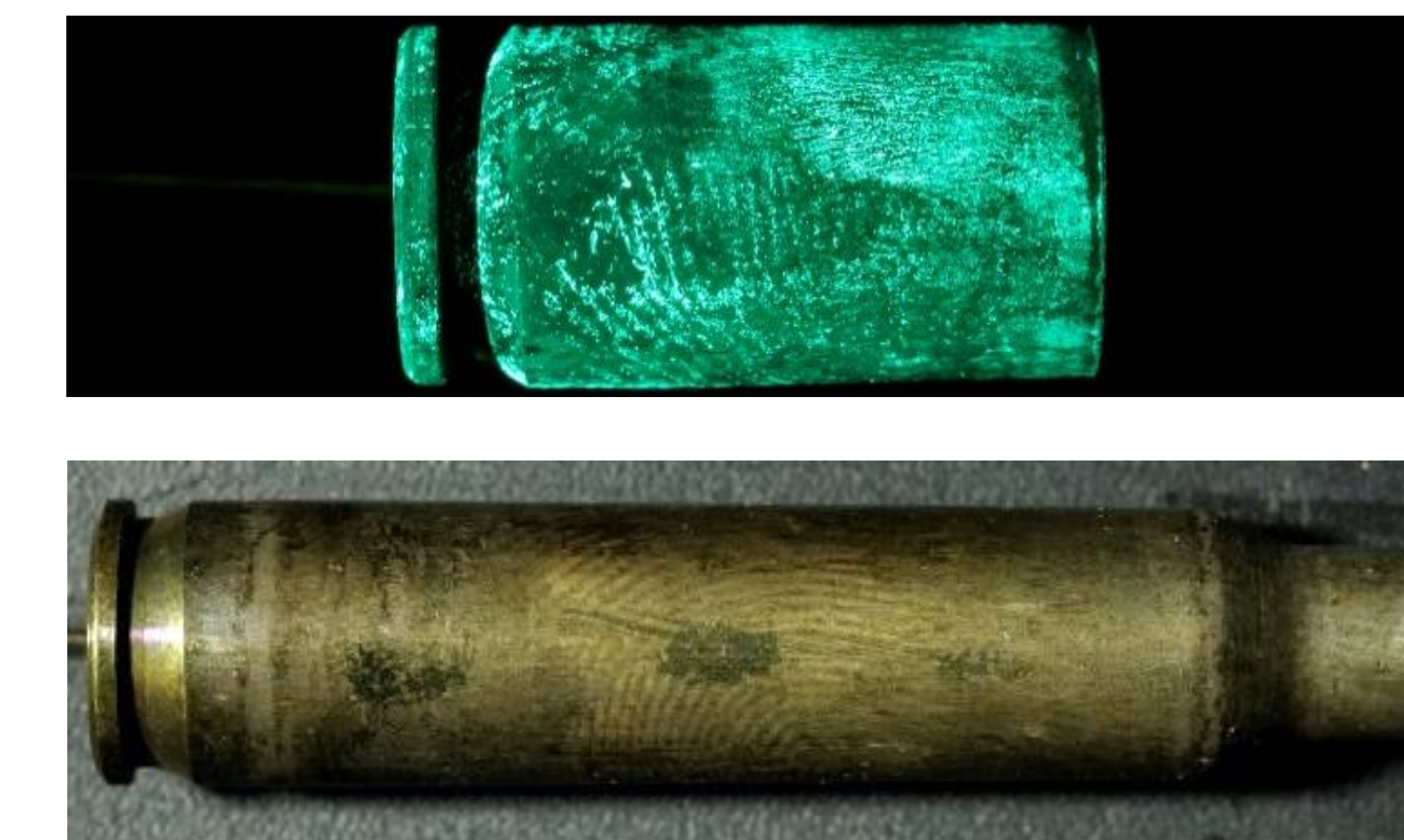
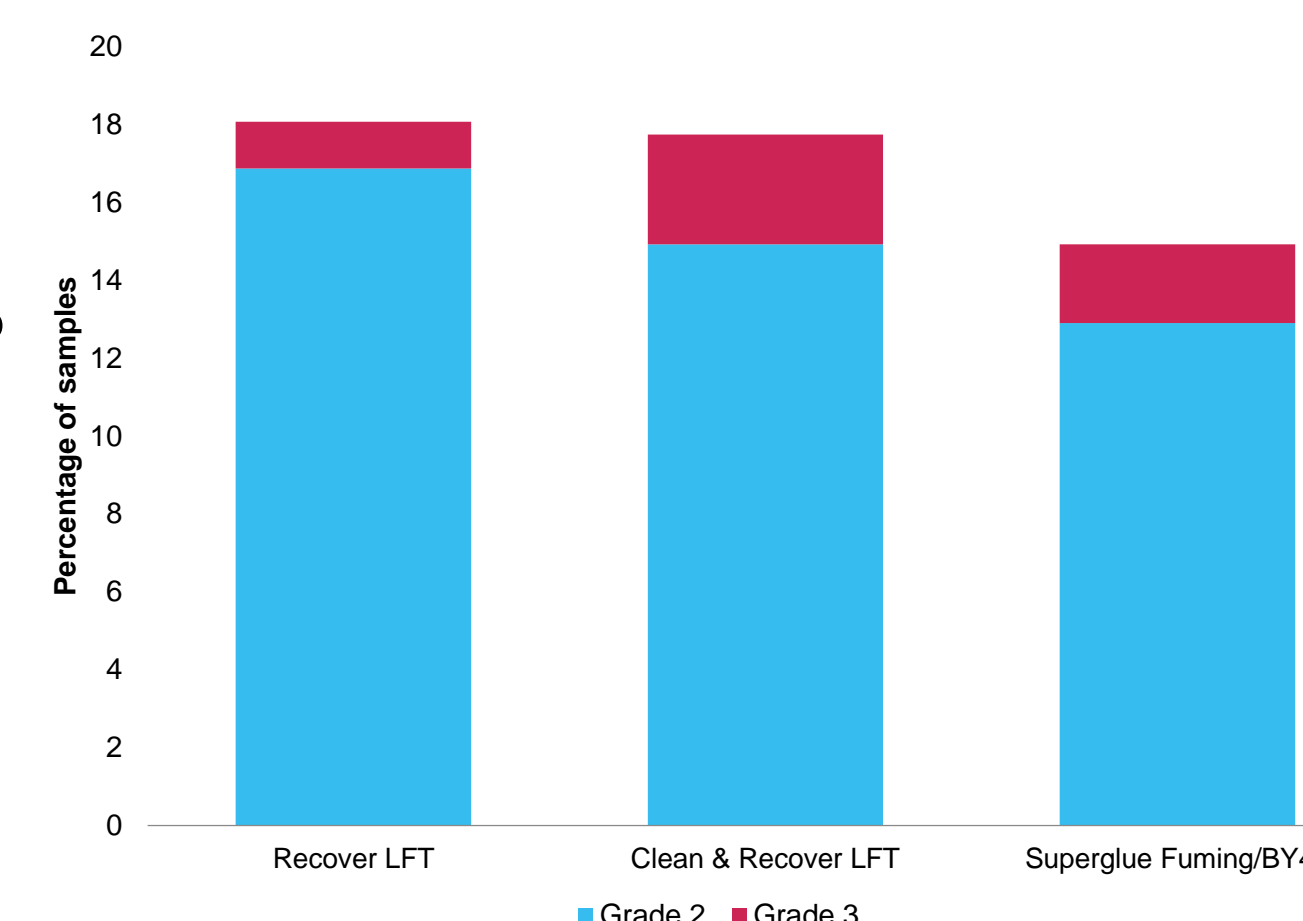
- 180 kitchen knives - 2880 fingermarks.
- Fingermark ages: 1 day, 1 week, 3-4 months.
- 1st & 10th depletion marks.
- Five commonly used chemical processes.
- Grading: 0-4 grading scheme. Grades 3 & 4 considered identifiable.



RESULTS

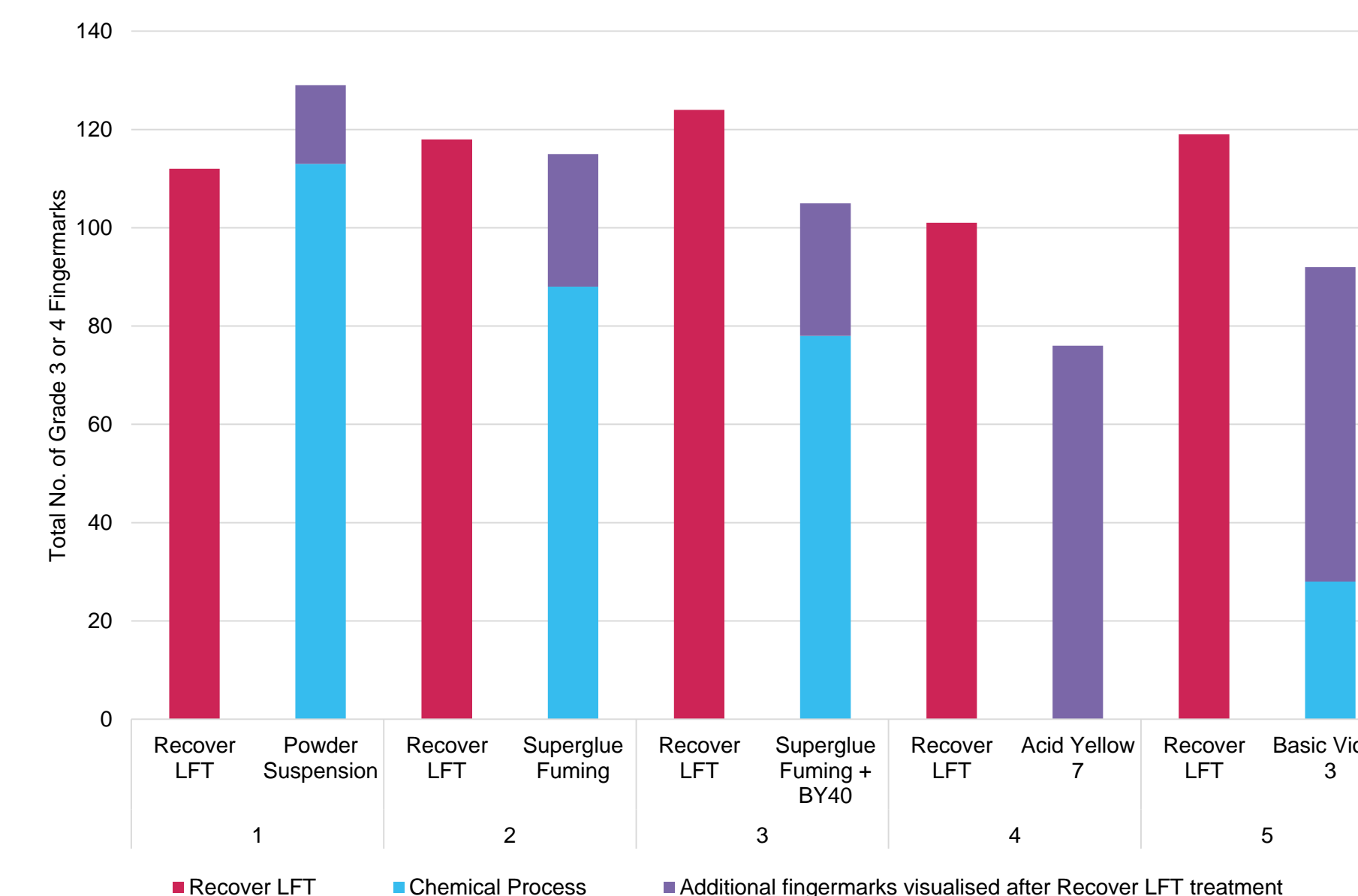
Study 1 – Fired Cartridge Casings

- Recover® LFT with and without a cleaning stage developed ~3% more Grade 2 and Grade 3 marks than Superglue/BY40.
- Superglue Fuming/BY40 treated samples developed highest quantity of grade 1-3 results.
- Cleaning prior to Recover® LFT treatment produced highest proportion of Grade 3 and Grade 0 results.



Study 2 – Stainless Steel Knife Blades

- Recover® LFT similar in performance to Carbon-based Powder Suspension.
- Recover® LFT visualised more marks than Superglue Fuming (with & without BY40).
- Recover LFT can visualise further marks after a chemical process.
- Less marks observed using Recover® LFT if another chemical process (with and without cleaning) was completed beforehand.



CONCLUSIONS

- Recover® LFT is a promising process, in particular for stainless steel knife blades.
- Recover® LFT may develop additional marks when processed after conventional fingerprint visualisation techniques.
- Recover® LFT may be beneficial within cold casework when used as a standalone process or at the end of a sequence.
- Cleaning prior to Recover® LFT processing offered no clear benefit in these studies.
- Ageing period of 30 minutes used within the casings study may not have been long enough for sufficient fingerprint/substrate reactions to occur, subsequently affecting fingerprint development.



POTENTIAL USE IN CASEWORK

- Recover® LFT is currently validated by the Metropolitan Police Service as an end of sequence process on knives, ammunition and cartridge casings. However, it may also be useful on other metal surfaces.
- Recover® LFT will be utilised on items that may have been subjected to adverse conditions, such as knives found following wet weather, partially buried or recovered from drains/streams.
- Recover® LFT may also be beneficial within cold case reviews where metal items have already been subjected to a wide range of fingerprint development techniques which haven't developed marks or where previously developed fingerprints were of limited quality.
- Although Recover® LFT is presently recommended as an end of sequence process, preliminary findings suggest it may be utilised earlier in a sequence of treatments - further studies are required.