Lockpicking Forensics

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Defcon 17, 2009
Agenda

• How locks/picks work
• Normal wear
• Lock Analysis
• Key Analysis
• Investigative process
Destructive entry still #1!
How Locks Work
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How Locks Work
Pin Binding
Picking a Lock

• Apply tension
• Find binding pin
• Raise to shear line
• Repeat
Picking a Lock
Forensic Locksmithing

• 1976 - Art Paholke, Chicago PD

• Locks, Safes, Security (Tobias)
• Werkzeugspur (Goth)
• Impressioning (Diederichsen)

• Determine method of entry
• Identify evidence, tool marks, techniques
• Provide expert testimony
Pins – New
Pins – New
Key - New
Plug - New
Pins – 100 uses
Pins – 100 uses
Plug – 100 uses
Key – 100 Uses
Pins – 1,500 uses (pin 1)
Pins – 1,500 uses (pin 5)
Key – 1,500 uses
Plug – 1,500 uses
Pins - 5,000 uses (pin 1)
Pins - 5,000 uses (pin 5)
Plug – 5,000 uses
Plug – 5,000 uses
Plug – 5,000 uses
Key - 5,000 uses
Forensic Analysis

• Components (pins, springs, etc)
• Plug
• Cylinder
• Cam/Actuator
• Keys
• Bolt
• Door, window, wall, etc
Lockpicking
Lockpicking - Pins
Lockpicking - Pins
Lockpicking - Pins
Lockpicking - Pins
Lockpicking - Pins
Lockpicking - Pins
Lockpicking - Pins
Lockpicking - Pins
Lockpicking - Pins
Lockpicking - Pins
Lockpicking - Plug
Lockpicking - Plug
Lockpicking - Plug
Lockpicking - Plug
Lockpicking - Plug
Lockpicking - Plug
Lockpicking - Tension
Lockpicking - Tension
Lockpicking - Tension
Lockpicking - Cam
Lockpicking - Cam
Lockpicking - Medecoder
Pick Guns - Pins
Pick Guns - Pins
Pick Guns - Cam
Pick Guns - Cam
Key Bumping
Key Bumping
Key Bumping - Pins
Key Bumping - Pins
Key Bumping - Pins
Key Bumping - Pins
Key Bumping - Pins
Key Bumping - Pins
Key Bumping - Plug
Key Bumping - Face
Key Bumping - Face
Key Bumping - Plug
Impressioning
Impressioning - Manipulation
Impressioning - Manipulation
Impressioning - Plug
Impressioning – UV residue
Impressioning – UV Residue
Decoding

• Depends on technique
• Covert vs. surreptitious
• Decoder “pick”
• Manipulation
• Visual/Optical
• Thermal
• Radiological
• Disassembly
Decoding - Visual
Decoding - Visual
Bypass

Plug

Pins

Cam
Bypass
Bypass
Key Analysis

- Material, keyway, cuts, codes
- Original or duplicate
- Hand cut or machined
- Recent cutting, copying
- Material transfer
Keys - Plating
Keys – Original vs Copied
Keys – Original vs Copied
Keys – Stylus striae
Keys – Hand made
Keys – Filed
Keys – Filed
Keys - Dremel
Keys – Cutting Wheels
Keys - Comparison
Key - Bumping
Keys – Bumping
Keys – Tool Marks
Keys – Tool Marks
Keys – Tool Marks
Keys – Clay residue
Keys – Wax residue
Keys – UV Residue
Anti-forensics Tools?

• Possible!
• Difficult to use
• Limited durability
• Expensive*
Safe/Vault Forensics

- Drill points
- Writing/marking
- Magnetic/adhesive
- Tool marks
Investigative Process

- Crime scene investigation
- Laboratory examination
- Investigative report
- Testimony
Crime Scene Investigation

• Photographs
• Sketches
• Permission issues
• Evidence preservation
• Chain of custody

• Police vs. Insurance
Initial Questions

• Purchase/Installation
• Per day usage
• Security rating(s)
• Key/combo distribution
• Lock condition
  - Working?
  - Repaired?
  - Replaced?
Forensic Examination

• Lock specs & data
• Lock operation
• Lock security rating
• Tool marks
• Material transfer
• Keys

• Do your homework!
Disassembly

- Chamber casings
- Use of key(s)
- Shimming
- Destructive
Shimming
Forensic Workspaces

• Separate!

• Clean area

• Clean/new tools
  − Tweezers, followers, shims
  − Saws
  − Clay
  − Hands/etc
Cleaning of Components

• To clean or not?
• Always look first!
• Evidence destruction
• False evidence creation
Cleaning of Components
Investigative Report

• Findings
• Supporting pictures
• Mirrored locks*
  - Picked
  - Pick gun
  - Bumped
  - Impressioned
Licensing & Certification

• International Association of Investigative Locksmiths (IAIL)
Resources

http://www.LockpickingForensics.com


http://www.LockWiki.com