Lockpick

Pins
Wafer
Combo
Resistant
Bumping
Impression
Mastering
Picks
Forensics
Resources
Why do Locks Matter?
Locks Hold a Special Place in Our Lives
Locks Hold a Special Place in Our Lives
Locks Hold a Special Place in Our Lives
Locks Hold a Special Place in Our Lives
“What Does a Lock Signify?”

(Schuyler Towne at RVAsec 2012)
“What Does a Lock Signify?”

(Schuyler Towne at RVAsec 2012)
Puzzles
Puzzles
Puzzles
Lockpicking is fun puzzle solving for us.
Try your hand at Lockpicking Games…
... Win Fabulous Prizes and Become Famous!
The Competition Can Get Serious
Intro to Lockpicking
First, a word about rules...

Yes, we have rules. 😊

1. Do not pick locks which you do not own.

2. Do not pick locks upon which you rely.
The Three Kinds of Lock-Opening
The Three Kinds of Lock-Opening

1. Lockpicking
The Three Kinds of Lock-Opening

1. Lockpicking

2. Quick & Dirty
The Three Kinds of Lock-Opening

1. Lockpicking

2. Quick & Dirty
The Three Kinds of Lock-Opening

1. Lockpicking – what we do

2. Quick & Dirty
The Three Kinds of Lock-Opening

1. Lockpicking - what we do

2. Quick & Dirty - what criminals do
The Three Kinds of Lock-Opening

1. Lockpicking - what we do

2. Quick & Dirty - what criminals do
The Three Kinds of Lock-Opening

1. Lockpicking - what we do
   TOOOL provides the knowledge and the means

2. Quick & Dirty - what criminals do
   TOOOL provides knowledge... but no means
Lockpicking is Easy!
Pin Tumbler Locks
Pin Tumbler Locks
Pin Tumbler Locks
Outer View
Inner View
Attempt Without a Key
Operating With a Key
Pin Stacks
Key Operation
One Bitting Too Low
One Bitting Too High
In a Perfect World
In the Real World
In the Real World
In the Real World
“Setting” a Binding Pin
The Key Pin Can Still Move Freely
Setting Multiple Pins
Take Caution to Avoid Over-lifting
Other Tools One Uses
Raking
Raking
The Half-Diamond
Lifting with a Half-Diamond
Raking/Shoveling with a Half-Diamond
Using the Flat Underside
Using the Flat Underside
Counting Pin Stacks
Counting Pin Stacks
Counting Pin Stacks
Turning Tools
Bad Turning Tool Usage (Pulling)
Better Turning Tool Usage (Pushing)
Best Turning Tool Usage (Pushing Out at Tip)
Good Turning Tool Pressure
Too Much Turning Tool Pressure!
Turning Tool Position: “Edge of the Plug”
“Standard” Turning Tools
Space in the Keyway
Space in the Keyway
Careful to not Cause Extra Friction
“Standard” vs “Flat” Turning Tools
Turning Tool Position: “Center of the Plug”
More Space in the Keyway
Turning Direction
Turning Direction
Turning Direction
Turning Direction
Turning Direction
Turning Direction

Left-Handed Door

Right-Handed Door
Who Wants To Try?
Practice Locks
Either Direction Will Work
Starter Exercises
Starter Exercises
Starter Exercises
Starter Exercises
Direct Lifting
Rocking Lifting
The Two Most Important Things...

RELAX

http://tool.us
The Two Most Important Things…

OPEN!
Questions?
Wafer Locks
Wafer Locks
Wafer Locks
Wafer Locks - Outer View
Wafer Locks - Inner View
Wafer Locks - Operating Action
Wafer Lock Usage
Wafer Lock Usage
Wafer Lock Usage
Questions?
Combination Locks
If You Are Doing This...
If You Are Doing This... What You Are Saying Is This...
Padlock Shims
Padlock Shims
Homebrew Padlock Shims
Homebrew Padlock Shims
Homebrew Padlock Shims
Homebrew Padlock Shims
Homebrew Padlock Shims
Homebrew Padlock Shims
Homebrew Padlock Shims
Homebrew Padlock Shims
Homebrew Padlock Shims
Homebrew Padlock Shims
Homebrew Padlock Shims
Homebrew Padlock Shims
A tale of Homebrew Shims
A tale of Homebrew Shims
A tale of Homebrew Shims
A tale of Homebrew Shims
A tale of Homebrew Shims
Single Latch or Dual Latch?
Shim-Proof Padlocks... Double-Ball Mechanism
Shim-Proof Padlocks... Double-Ball Mechanism
Shim-Proof Padlocks... Double-Ball Mechanism
Shim-Proof Padlocks... Double-Ball Mechanism

Candado doble traba a bolilla
acero inoxidable
Some People Seemingly Don’t Know There’s a Risk
Some People Seemingly Don’t Know There’s a Risk
Decoding the Combination?

139126
927635
31 33 07

1. TO OPEN—Turn RIGHT 3 times. Stop at 1st number.
2. Turn LEFT one full turn passing the 1st number to stop at 2nd number.
3. Turn RIGHT and stop at 3rd number. Pull Shackle.

Remove Tag And Save
Save your combination at
www.combolocker.com
Decoding the Combination
Decoding the Combination
Decoding the Combination
Decoding the Combination
Decoding the Combination
Decoding the Combination
Decoding the Combination
Decoding the Combination

2½  5  8½
12½ 15  18½
22½ 25  28½
32½ 35  38½
Decoding the Combination

2½  5  8½
12½ 15  18½
22½ 25  28½
32½ 35  38½
Decoding the Combination
Decoding the Combination

2½
12½
22½
32½
Decoding the Combination

2½  12½  22½  32½
Decoding the Combination

$2\frac{1}{2} \quad 12\frac{1}{2} \quad 23 \quad 32\frac{1}{2}$
Decoding the Combination

\[
\begin{array}{cccc}
2.5 & 5 & 8.5 & \\
12.5 & 15 & 18.5 & \\
23 & 25 & 28.5 & \\
32.5 & 35 & 38.5 & \\
\end{array}
\]
Decoding the Combination
Decoding the Combination

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>2½</td>
<td>5</td>
<td>8½</td>
</tr>
<tr>
<td>12½</td>
<td>15</td>
<td>18½</td>
</tr>
<tr>
<td>23</td>
<td>28</td>
<td>38½</td>
</tr>
<tr>
<td>32½</td>
<td>35</td>
<td>38½</td>
</tr>
</tbody>
</table>
Decoding the Combination

- 2 \frac{1}{2} \quad 5
- 12 \frac{1}{2} \quad 15
- 32 \frac{1}{2} \quad 35

- 8 \frac{1}{2} \quad 28 \frac{1}{2}
Decoding the Combination

[Excel spreadsheet image]

[Link to file: http://deviating.net/lockpicking/media/masterlock.xls]
Decoding Multi-Wheel Combinations
A New Kind of Combination Padlock
A New Kind of Combination Padlock
A New Kind of Combination Padlock
A New Kind of Combination Padlock
A New Kind of Combination Padlock
Questions?
Pick-Resistant Locks
Pick-Resistant Keyways

Simple... straight and wide
Pick-Resistant Keyways

Simple... straight and wide
Medium... straight but narrow
Pick-Resistant Keyways

Simple… straight and wide
Medium… straight but narrow
Complex… thinner and curvy
Pick-Resistant Keyways

Simple... straight and wide
Medium... straight but narrow
Complex... thinner and curvy
Hard... lots of angles
Pick-Resistant Keyways

Simple... ... straight and wide
Medium... ... straight but narrow
Complex... ... thinner and curvy
Hard... ... lots of angles
Fiendish... ... overlapping wards
Pick-Resistant Pins
Pick-Resistant Pins - Spool Pin
Pick-Resistant Pins - Spool Pin Binding
Pick-Resistant Pins - Spool Pin Picking
Pick-Resistant Pins - Mushroom Pin
Pick-Resistant Pins - Serrated Pin
Pick-Resistant Pins - ASSA

"Sneaky" Pin
Pick-Resistant Pins - TrioVing
“Double Mushroom” Pin
Pick-Resistant Locks

a substantial improvement...

...can be picked, but only with much skill and time.
Questions?
Lock Bumping

• Just a Special Key
• Little Special Skill
• Many Locks are Vulnerable
• Exploit Related to Pick Gun Physics
Lock Bumping
Lock Bumping
Snapping Guns
Snapping Guns
Snapping Guns
Snapping Guns
Lock Bumping - Pull Method
Lock Bumping - Push Method
Lock Bumping - Push Method
Lock Bumping

http://toool.nl/bumping.pdf
Lock Bumping

photo courtesy of datagram
Bumping Countermeasures - Top Gapping
Bumping Countermeasures - Anti-Bump Driver Pin
Bumping Countermeasures - Anti-Bump Driver Pin
Bumping Countermeasures - Anti-Bump Solution

Bump Halt™ (Bump Resistant Cylinders)

Bump Halt provides a “bump resistant” solution for the ilco line of Key in knob / Key in Deadbolt, Mortise and Rim Cylinders. This Innovative Patent Pending solution to bumping will resist the transfer of force from the bump key to the pins.

Kits are also available that will enable conversion of a new or existing Ilco Cylinder.

- Effective yet cost efficient
- No special tools or machining required
- Available factory installed or as a conversion kit
- Conversion kits contain 10 pins, 10 springs and instructions (one pin and one spring will resist bumping; add an additional pin and spring to increase the security.

Bump Halt™ has not been tested on competitive brands of cylinders.
Bumping Countermeasures - Anti-Bump Driver Pin

Part Number: 7000BH 00 10

List Price: $17.82

Dealer Price: $8.91
Bumping Countermeasures - Anti-Bump Driver Pin
Locksmiths

Good Locksmith
212-431-1287

http://tool.us
Locksmiths
Locksmiths
Locksmiths

1. ALOA logo / ALOA number
2. Name
   Discrepancies
3. Estimates & Itemized Invoice
Questions?
Why Impressioning?
Why Impressioning?
Impressioning - Blank Key to Raise all Stacks
Impressioning - Turn Hard to Bind a Key Pin
Impressioning - Binding and Wiggling Causes Rubbing
Impressioning - Observe the Rub Marks
Impressioning - Observe the Rub Marks
Impressioning - Observe the Rub Marks

[Image of a key with an arrow pointing to the rub marks]
Impressioning - File Down at the Rub Marks
Impressioning - Repeat the Process
Impressioning - Stack 4 is still Binding
Impressioning - Stack 4 is still Rubbing
Impressioning - Stack 2 is still Binding
Impressioning - Stack 2 is still Rubbing
Impressioning - Continued Rub Marks
Impressioning - Continued Rub Marks
Impressioning - Continued Rub Marks
When the Key is Inserted Now...
Pin Stack Number 4 is No Longer Binding
You’ll Know This Has Happened
When *New* Marks Appear
You’ll Know This Has Happened
When *New* Marks Appear
You’ll Know This Has Happened
When New Marks Appear
You’ll Know This Has Happened
When *New* Marks Appear
You’ll Know This Has Happened When *New* Marks Appear
It’s Delicate & Intricate Work
It’s Delicate & Intricate Work

Can You Spot the Mark Here, By The Way?

HTTP://TOOOL.US
It's Delicate & Intricate Work

Bazinga.
It’s Delicate & Intricate Work
It’s Delicate & Intricate Work
Open!
Open!
Open!
Impressioning Competitions
Impressioning Competitions
Questions?
Master-Keyed Systems
Master-Keyed Systems

• Varied permissions
• Sometimes keyway
• Privilege Escal
Master-Keyed Systems
Master-Keyed Systems
Master-Keyed Systems
Finding the Master Bitting Depth

Original key cut
Lock opens
Finding the Master Bitting Depths

Leave this position, Lock does not open.
Finding the Master Bitting Depth

2 Cut down slightly...

Lock does not open
Finding the Master Bitting Depths

4 Cut down a little

Lock still does
Finding the Master Bitting Depths

Cut down more... Lock opens!
Finding the Master Bitting Depths

“Master-Keyed Lock Vulnerability”
by Matt Blaze
2003-01-27

http://www.crypto.com/masterkey.html
Questions?
Distinguishing Picks
There are many lockpick vendors...
There are many lockpick vendors...
There are many lockpick vendors...
Selling many lockpicking tools
First, let’s talk about metal…
Spring Steel
Stainless Steel
Titanium
Other Metals?
Thickness

0.015" - Peterson “Government Steel”

0.020" - SouthOrd, Rytan, Southern Specialties, TOOOL

0.022" - HPC Stainless

0.025" - original TOOOL kits
“Standard” vs. “Euro”
“Standard” vs. “Euro”
“Standard” vs. “Euro”
“Standard” vs. “Euro”
The real confusing mess...

Categories & Names
What would you call these?
Hooks (a.k.a. Lifters)
Hooks (a.k.a. Lifters)
Hooks (a.k.a. Lifters)

- Short Hook
- Flat Short Hook (round)
- Medium Hook
- Gonzo Hook
- Long Hook
Hooks (a.k.a. Lifters)

Typical

Useful

Meh

Awesome

FAIL
What would you call these?
Reach Tools

Deep Curve

Hybrid
You’ve all seen these...
Diamonds

Small

Medium

Large

Diamond

Head
Dear God,
Why??

Maybe

Yes

No
How would you categorize these...?
Offset Tools
Offset Tools

Offset

Offset

Offset

Offset
Offset Tools

Yeah, sure.

Meh, why not?

Really?
Balls, balls, balls...
Balls, balls, balls...
Balls, balls, balls...

Single BALL

Snowman

Half

Half BALL
Balls, balls, balls...

Pretty
Useless
Can Be
Useful
Tight
Spaces?
We Will
Mock You
What would you call these?
Raking tools... Welcome to Crazy Land
Raking Tools

- Snake
  - a.k.a. C Rake
  - a.k.a. Double Rake

- Three Quarter Snake
  - a.k.a. Rake-and-a-Half

- Half Snake
  - a.k.a. Single Rake

- Double Snake
  - a.k.a. Quad Rake

- Stretched Snake
  - a.k.a. S Rake

- Batarang
  - a.k.a. S Rake
  - a.k.a. Camel Back
Raking Tools

- Snake
- Three Quarter Snake
- Half Snake
- Double Snake
- Stretched Snake
- Batarang

a.k.a. C Rake, Double Rake
a.k.a. Rake-and-a-Half
a.k.a. Single Rake
a.k.a. Quad Rake
a.k.a. S Rake
a.k.a. S Rake, Camel Back

Dangerous Weakness
What about something like this...
“Raking” vs. “Lifting”
Raking
Raking
Lifting
Jagged Lifters

- **Wedge**
  - a.k.a. W Rake,
  - Short Jag,
  - Ramped Tool
- **Long Rake**
  - a.k.a. L Rake,
  - Long Jag,
  - Ripple,
  - Saw Tooth
- **Falle**
  - a.k.a. Long Rimple
- **Falle Hump**
So, what on earth are these?
King & Queen

King Pick

Queen Pick
A major innovation in pick tools

Thanks to Minnesota...

... with a nod to Colombia
Raimundo’s Family of Tools
It Started with Two Tools…

“Jiggler” Tools
What is Jiggling?

In Between Raking & Lifting ...
What is Jiggling?

... There is “Jiggling”
Bogotá Family

Bogotá

Single Hump a.k.a.
Hollow Half Diamond
# Bogotá Family

<table>
<thead>
<tr>
<th>Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bogotá</td>
<td></td>
</tr>
<tr>
<td>Single Hump</td>
<td>a.k.a. Hollow Half Diamond</td>
</tr>
<tr>
<td>Two Hump</td>
<td>a.k.a. Camel</td>
</tr>
<tr>
<td>Quad Hump</td>
<td></td>
</tr>
<tr>
<td>Sabana</td>
<td></td>
</tr>
</tbody>
</table>

Questions?
Lockpicking & Forensics
Keys Touch Very Specific Places
Virgin Pins Have Specific Patterns From Manufacturing
Concentric Tiny Ridges on Pin Face
Those Rings "Polish Away" With Use
250 Uses
Those Rings “Polish Away” With
Use 1500 Uses
Those Rings “Polish Away” With
Use 5000 Uses
The Plug Picks Up Marks From Driver Pins

250 Uses
The Plug Picks Up Marks From Driver Pins

1500 Uses
The Plug Picks Up Marks From Driver Pins

5000Uses
Picks Touch Places That Keys

Don’t
Wear and Tear or Toolmarks?
Wear and Tear or Toolmarks?
Wear and Tear or Toolmarks?
Wear and Tear or Toolmarks?
Forensics - Lifting Picking
Forensics - Raking
Forensics - Mixed Styles of Picking
Forensics – Ugh... Who Did This??
Forensics - Even Skilled Pickers and Soft Touches Leave Marks
Repeated Snap Marks
Some People Poke Too Deep
Tools Too Deep - Marks in Rear Top of Keyway
Tools in Too Deep - Marks on Tail Cap
Tension Tools in the Keyway
Tension Tools can “Pinch” the Keyway
Tension Tools can “Pinch” the Keyway
Fraudulent Toolmarks
Fraudulent Toolmarks
Bump Key Forensics
Bump Key Forensics
Bump Key Forensics
Bump Key Forensics
Questions?
Resources for Learning More
Resources For Learning More

• Books
  – *Practical Lock Picking & other books* by Deviant Ollam
  – *High Security Mechanical Locks* by Graham Pulford
  – *Locks, Safes, & Security* by Marc Tobias

• Videos
  – YouTube & Google
  – [http://deviating.net/lockpicking/videos.html](http://deviating.net/lockpicking/videos.html)

• On The Web
  – [http://toool.us](http://toool.us)
  – [http://toool.nl](http://toool.nl)
  – [http://blackbag.nl](http://blackbag.nl)
  – [http://deviating.net](http://deviating.net)
Resources For Learning More
Legal Questions

• We are not lawyers

• Purchase/Shipping through mail
  – Lock manufacturer
  – Auto dealer
  – Law enforcement
  – Repo man
  – Bona fide locksmith

• Possession & use
  – Burglary tools statutes
  – During an illegal act
Legal Questions

Legal by statute
Legal, no criminal statute
Legal, but note other laws
Acquiring Locks

• Free
  – Basements, garages, yard sales
  – Ask neighbors, ask locksmiths

• For sale
  – Vary your sources
  – Hardware store vs. eBay

• Specialized
  – Progressive kits
  – Ultimate practice lock
Security in the Real World
Security in the Real World
Security in the Real World

• Technical Finesse or
  – $100 lock in a $10 door
• Doors
  – Solid core, heavy hing
  – Anti-thrust bolts and
• Windows
  – Shatterproof film
  – Vulnerable to lifting? glass)
Security in the Real World

Lockpicking

Quick & Dirty \leftarrow \text{guard against these attacks}

Covert & High-Tech
What People Think About Lockpickers...
Some People Think We Are Shady...
...But We Are Regular Folks
Young and Old...
We Like Working With Our Hands...
...And Learning New Things
It’s Healthy Competition
Where The Fastest Time Wins
Thank You Very Much

http://tool.us

info@toool.us