## LOCKS, SAFES, AND SECURITY

## LSS+ Version 5.0

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Alfred Hobbs was able to bypass the Bramah lock. Courtesy of Hans Mejlshede.

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No Exhibits

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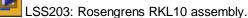
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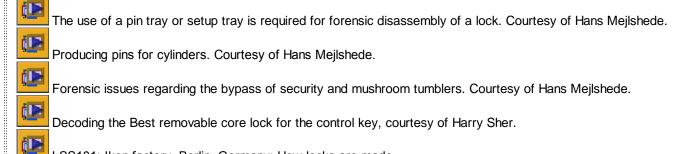
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Abloy master keying theory, Courtesy of Hans Mejlshede.

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Forced entry of Abloy locks, and forensic indications, Courtesy of Hans Mejlshede.

The Peter Field (Medeco) patent for a security tumbler. Courtesy of Hans Mejlshede.

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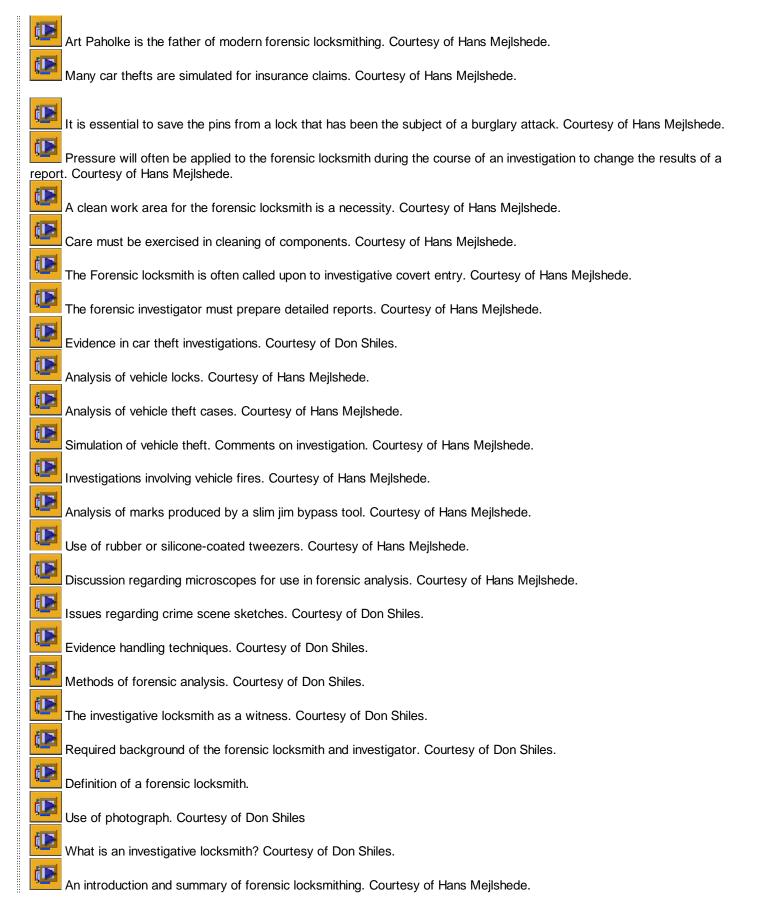
- Figure LSS+2322 Diagram of the ratchet locking mechanism of the Club.
- Figure LSS+2323. A modified Club that has been converted into a shotgun.
- Figure LSS+2324. The Silca RW2 Transponder decoder and copier.
- Figure LSS+2325 Railroad mail clerk badge and antique mail locks
- Figure LSS+2326 Post office locks, including the famous Andrus lock that was patented in 1914
- Figure LSS+2327 Arrow eight lever post office box lock, and lever tumbler
- Figure LSS+2328 Rotary registered mail lock produced by the U.S. Postal Service
  - Discussion of transponder theft. Courtesy of Hans Mejlshede.
- Bypass of push button locks. Courtesy of Don Shiles.
  - Discussion of Simplex push button lock, by Harry Sher
- Use of tryout keys, courtesy of Harry Sher.
  - LSS202: Ross Anderson on smart card technology

#### Chapter 24 Investigation and Evidence Involving Locks and Keys No Exhibits

- A forensic investigation involving the theft of a BMW automobile. Courtesy Hans Mejlshede.
  - Doing research on different bypass techniques is important for the forensic investigator. Courtesy of Don Shiles.
  - Analysis of a case involving forensics. Courtesy of Don Shiles.
  - Case example, burglary investigation. Courtesy of Don Shiles
  - Case example of hotel lock bypass. Courtesy of Don Shiles.
- Case example, Courtesy of Hans Mejlshede.
- Analysis of a case involving forensic locksmithing. Courtesy of Don Shiles.
  - Mail slot bypass device. Courtesy of Hans Mejlshede.
  - Keys can be copied by taking a 1:1 image using a copier machine. Courtesy of Hans Mejlshede.
  - Master key records. Courtesy of Hans Mejlshede.
  - Investigative clues that develop during a case. Courtesy Jim Bickers.
  - Pickability or ease with which a lock can be picked. Courtesy of Hans Mejlshede.

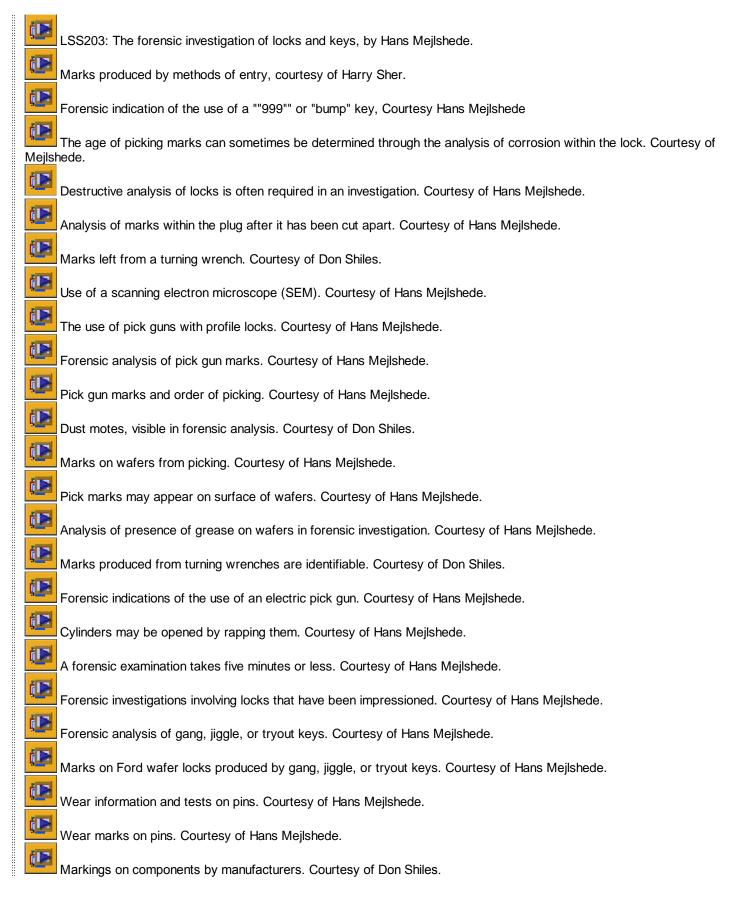
## Chapter 25 Forensic Examination: Specifications, Operations, and Security

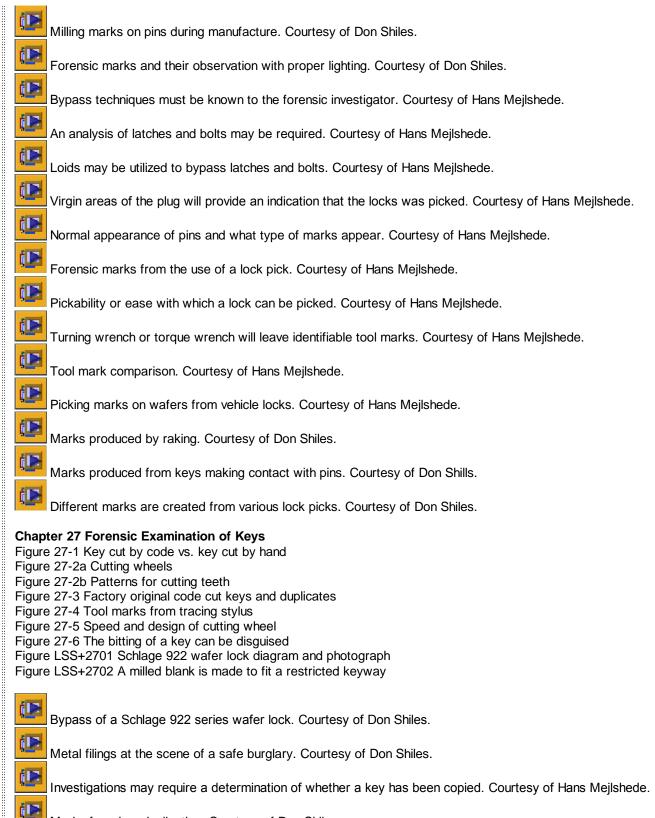
- Figure 25-1 Partially picked axial pin tumbler lock
- Figure LSS+2501 Forensic investigation forms
- Figure LSS+2502 Forensic evidence log-in report by Hans Mejlshede
- Figure LSS+2503 Sample forensic analysis form by Hans Mejlshede



(D	Forensic locksmithing history and the role of Art Paholke. Courtesy of Hans Meilshede.
	Was the lock picked? Courtesy of Don Shiles.
	Macro lens, Courtesy of Hans Mejlshede.
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æ	Data back for documentation of images. Courtesy of Hans Mejlshede.
	Photographic equipment requirements. Courtesy of Hans Mejlshede.
	Ring strobe is a necessity for forensic photography. Courtesy of Hans Mejlshede.
	Use of plastic tweezers. Courtesy of Hans Mejlshede.
	Recovering stamped numbers from keys and locks. Courtesy of Hans Mejlshede.
(D	Opinions of examiner, and certainty of their opinions. Courtesy of Hans Mejlshede.
	Logging receipt of evidence. Courtesy of Hans Mejlshede.
(D	Issues regarding investigative reports. Courtesy of Hans Mejlshede.
	It is difficult to bypass laser track locks through the use of jiggle keys. Courtesy of Hans Mejlshede.
(D	Definition of an Investigative locksmith. Courtesy of Don Shiles.
Þ	Forensic marks and their observation with proper lighting. Courtesy of Don Shiles.
(D	The investigative locksmith gets involved in insurance fraud cases. Courtesy of Hans Mejlshede.
Þ	Marks on the back of the lock from bypass. Courtesy of Hans Mejlshede.
	Use of WD-40 to clean and lubricate. Courtesy of Hans Mejlshede.
(D	Oxidation and dating of marks in a forensic examination. Courtesy of Don Shiles.
	Forensic implications of using a shim to open a lock prior to analysis. Courtesy of Hans Mejlshede.
(D	An attempt may be made to mask pick marks so that the perpetrator is not identified. Courtesy of Hans Mejlshede
Þ	Obtaining all keys that fit a particular cylinder. Courtesy of Hans Mejlshede.
Þ	Removal of cylinder and its analysis must be done correctly. Courtesy of Hans Mejlshede.
(D	Changing or removal of top pins. Courtesy of Hans Mejlshede.
Þ	Preliminary issues in the examination of a lock. Courtesy of Don Shiles.
Þ	Examination of a lock and disassembly. Courtesy of Don Shiles.
Þ	Examination of a lock and marks that are visible. Courtesy of Don Shiles.

Information during a forensic investigation. Courtesv of Don Shiles. Opening a lock using a blank key and a shim. Courtesy of Don Shiles. SS202: Forensic investigation and the locksmith, by Don Shiles Chapter 26 Forensic Examination: Tool Marks and Trace Evidence Figure 26-1a Cutting plugs Figure 26-1b Examining cut plugs Figure 26-2 Irregular marks on the inter-chamber area Figure 26-3 Corrosion within the plug Figure 26-4 Normal keyway striations Figure 26-5 Normal marks on bottom of pin tumblers Figure 26-6 Curved pick marks Figure 26-7 Mechanical snap pick gun marks Figure 26-8 Rake pick marks Figure 26-9 Electric vibrating pick marks Figure 26-10 Conventional curved pick marks Figure 26-11 Rake pick marks Figure 26-12 Electric vibrating pick marks Figure 26-13 Comb pick marks Figure 26-14 Scoring within the cylinder wall Figure LSS+2601 Cutaway view of plug, showing location of pick and tension wrench marks Figure LSS+2602 A cylinder that has been picked and raked (left) and picked, then a forced entry tool was utilized. Figure LSS+2603 An electric pick gun was utilized to open the lock on the left; impressioning and picking was utilized to open the lock on the left. Figure LSS+2604 Impression, rake picking marks in plug Figure LSS+2605 Normal use marks, and those from impressioning Figure LSS+2606 Forensic marks from picking within lock body Figure LSS+2607 Forensic marks on, normal pin from the factory Figure LSS+2608 Forensic marks on pin from electric pick gun Figure LSS+2609 Forensic marks on pin caused by impact tool such as pick gun Figure LSS+2610 Forensic picking marks caused by a manual pick on surface of pin Figure LSS+2611 Forensic marks on pin from pick gun and a rake pick Figure LSS+2612 Forensic marks on pin caused by use of a key, a pick, and electric pick gun Figure LSS+2613 Forensic marks on pin caused by conventional picking Figure LSS+2614 Forensic marks on pin from a pick gun Figure LSS+2615 Forensic marking on pin from a 999 key or bump key Figure LSS+2616 Scanning electron microscope configuration, Jeol 5900 Figure LSS+2617 SEM photograph of pick tracks within lock, 220x magnification Figure LSS+2618 SEM photograph of pick tracks within lock, 1000x magnification Figure LSS+2619 SEM photograph of pick tracks within plug, 400x magnification Figure LSS+2620 SEM photograph, surface of pick at 220x magnification Figure LSS+2621 SEM photograph of pick marks on pin at 1000x magnification Figure LSS+2622 SEM photograph of pick marks on plug Figure LSS+2623 SEM photograph of surface of pick at 50x magnification Figure LSS+2624 SEM photograph of surface of pick at 50x and 500x magnification Figure LSS+2625 SEM photograph of surface of pick at 100x magnification LSS101: Scanning electron microscope Part I: Michael Platek (D LSS101: Scanning electron microscope Part II: Michael Platek ίÞ LSS101: Scanning electron microscope Part III: Michael Platek





Marks from key duplication. Courtesy of Don Shiles.

## Chapter 28 General Introduction to Bypass

No Exhibits

Discussion of different bypass techniques. Courtesy of Don Shiles.

Bypass of an American Padlock Series 700. Courtesy of Don Shiles.

Forensic analysis of gang, jiggle, or tryout keys. Courtesy of Hans Mejlshede.

Marks on Ford wafer locks produced by gang, jiggle, or tryout keys. Courtesy of Hans Mejlshede.

External bypass of a solenoid using a magnetic field. Courtesy of Don Shiles.

LSS303: Analysis of bypass techniques, by John Falle

LSS204: Brian Chan on the disassembly of a lock and derivation of the TMK

Chapter 29 Picking Figure 29-1 Paracentric keyways Figure 29-2 Double Detainer Locking theory Figure 29-3 Tolerance errors Figure 29-4 Rake picks Figure 29-5 Rocker picks Figure 29-5 Rocker picks Figure 29-6a Mechanical pick guns Figure 29-7a Electric pick guns Figure 29-7b Early vibrating pick gun Figure 29-8 Comb pick Figure 29-9 Security tumblers Figure 29-10 Professional pick set Figure 29-11 HPC stainless steel pick set Figure 29-20 Parts

Figure 29-12 Ball picks

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- Figure 29-13 Diamond and half-diamond picks
- Figure 29-14 Hook and deep hook picks
- Figure 29-15 "999" key
- Figure 29-16 Torque wrenches
- Figure 29-17 John Falle professional torque wrenches
- Figure 29-18 HPC spinner wrench
- Figure 29-19 Round spring loaded tension wrench
- Figure 29-20 HPC tension wrench
- Figure 29-21 HPC skeleton keys for warded padlocks
- Figure 29-22 Rake picks for double-bitted wafer locks
- Figure 29-23 SEA laser track key
- Figure 29-24 Two-in-one picking tool
- Figure 29-25 Two-in-one picks for lever locks
- Figure 29-26 Martin Newton two-in-one pick
- Figure 29-27 False or serrated gates within a lever tumbler
- Figure 29-28 Brush pick
- Figure 29-29 Bypassing ASSA sidebar locks
- Figure 29-30 Decoding tool for Medeco sidebar lock
- Figure 29-31 Decoder for Chicago tubar pin tumbler lock
- Figure 29-32 Early bypass tools
- Figure 29-33 Silvera's complex picking tool
- Figure 29-34a Custom tools for bypassing complex locking systems
- Figure 29-34b Specialized bypass tools
- Figure LSS+2901 Application of torque when picking
- Figure LSS+2902 HPC Flip-it tool, proper use
- Figure LSS+2903 Insertion of pick into the lock
- Figure LSS+2904 Comb pick by John Falle

Figure LSS+2905 MSC (Hamburg) produces different shaped torque wrenches Figure LSS+2906 MSC produces a spring-loaded tension wrench like HPC Figure LSS+2907 Warded lock diagram of keys and lock Figure LSS+2908 Warded keys used to open locks, including burglars skewer Figure LSS+2909 Warded skeleton keys Figure LSS+2910 An axial cylinder, picked and locked Figure LSS+2911 Axial pick and decode tool setup Figure LSS+2912 Axial pick tool inserted into a lock Figure LSS+2913 Axial lock picked and decoded Figure LSS+2914 MSC Sputnik picking and decoding tool Figure LSS+2915 MSC Sputnik detail of construction Figure LSS+2916 MSC Sputnik tool; the wires drive individual pins Figure LSS+2917 MSC Sputnik tool, internal detail of wire guides Figure LSS+2918 MSC Sputnik tool, wires protruding to control pins Figure LSS+2919 MSC Sputnik tool, one wire protruded Figure LSS+2920 MSC Sputnik tool, pins can be moved to any position Figure LSS+2921 The John Falle pick set detail Figure LSS+2922 The John Falle two-in-one wheel pick set and two locks that it will open. Courtesy of John Falle. Figure LSS+2923 A set of "jiggers" to bypass lever locks. Courtesy of John Falle. Figure LSS+2924 A variety of lever lock picking tools are produced by John Falle. Figure LSS+2925, Diagram showing order of picking, and the misalignment of the five chambers. Figure LSS+2926 Plug partially picked. Figure LSS+2927 John Falle comb pick set Figure LSS+2928 Safe opening tools for lever locks Figure LSS+2929 The theory of lock picking Figure LSS+2930 The use of a comb pick Figure LSS+2931 The MSC cross pick Figure LSS+2932 The MSC Electropick allows controlled manipulation of pin tumblers. Figure LSS+2933 MSC acoustic picking tool. Figure LSS+2934 Kromer Convar lever lock Figure LSS+2935 Kromer Novum lever lock Figure LSS+2936 Stuv lever lock Figure LSS+2937 Rosengrens ABN1 lever lock Figure LSS+2938 Rosengrens RKL10 lever lock Figure LSS+2939 Markings on levers to aid picking Figure LSS+2940 Axial lock pick and decoding tools by A-1 and Peterson Manufacturing. Figure LSS+2941 The Peterson pick tools for the Schlage Everest cylinder Figure LSS+2942 A rake pick for a dimple lock ίÞ The theory behind the use of the 999 key, Courtesy of Hans Mejlshede. The proper technique for the use of the 999 or bump key, Courtesy of Hans Mejlshede. Residue may be present when a dimple lock has been bypassed. Courtesy of Hans Mejlshede. (Þ Order of picking. Courtesy of Hans Meilshede. The use of pick guns and forensic analysis of locks. Courtesy of Hans Mejlshede. (Þ Use of a pick gun requires skill. It also leaves forensic indications. Courtesy of Hans Mejlshede. (D LSS201: MSC Assortment of tension wrenches, courtesy of Mahmod Abu Shanab (D LSS201: MSC "Sputnik" bypass tool, courtesy of MSC. ίÞ LSS202: The use of the "bump key" or "999" key, by Hans Mejlshede.

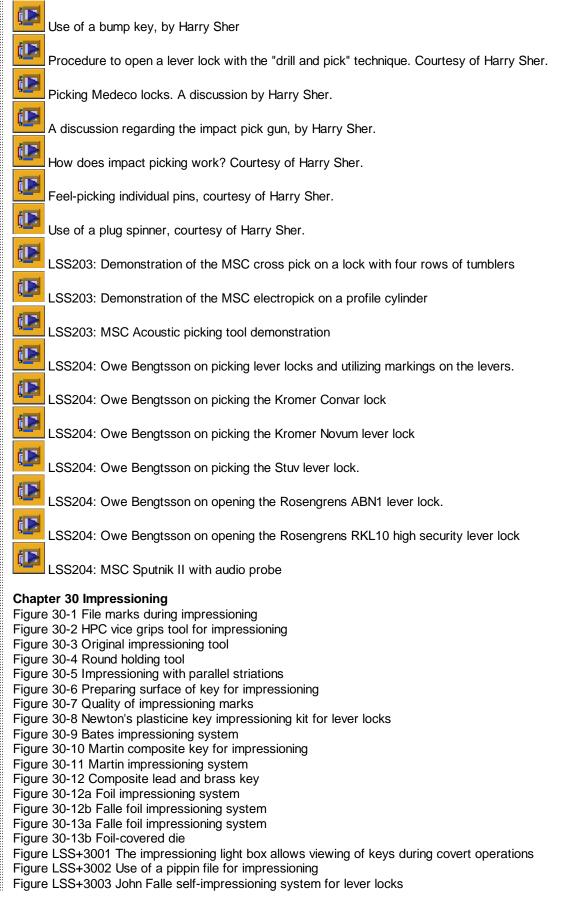


Figure LSS+3004 Falle foil impressioning system for specific dimple locks

Figure LSS+3005 Foil impressioning system for dimple locks by John Falle

Figure LSS+3006 Special dies for the Foil dimple impressioning system

įΡ A clever device for impressioning lever locks has been developed in Bulgaria. Courtesy of Hans Meilshede. (D The usefulness of the impressioning technique. Courtesy of Hans Meilshede. (D How does impressioning work? A discussion by Harry Sher. ( Þ A discussion about impressioning, by Harry Sher. άÞ LSS301: Foil impressioning system, by John Falle į D LSS304: DOM Dimple foil impressioning system, by John Falle Chapter 31 The Decoding of Locks: Theory, Procedures, and Technologies Figure 31-1 Falle magnetic key generation system for Medeco lock Figure 31-2 Japanese segmented variable key system Figure 31-3a Falle variable key system Figure 31-3b Falle variable key system Figure 31-4 HPC key micrometer Figure 31-5 Lever lock special decoder Figure 31-6a HPC Handheld decoder Figure 31-6b HPC Decoder data card Figure 31-7 HPC TKPD-1 decoder Figure 31-8 Falle Universal belly reader Figure 31-9 Falle basic lever decoder Figure 31-10a Falle Pin and Cam system Figure 31-10b Pin-kit for the Pin and Cam system Figure 31-11a Keys made by modified Falle Pin and Cam decoder Figure 31-11b Overlay cylinder on the CISA lever lock Figure 31-12a Falle European lever lock pick and decoder set Figure 31-12b Tools for measuring the bitting and reproducing the key for lever locks Figure 31-13 Falle European lever lock decoder Figure 31-14a Falle Lips lever lock decoder kit and pick Figure 31-14b Falle skirt lock wheel pick kit Figure 31-15 Falle decoder and pick set Figure 31-16a LeFebure impressioning and decoding system Figure 31-16b LeFebure impressioning and decoding system Figure 31-17 Fichet monopole lock Figure 31-18 Fichet "H" series lock Figure 31-19 Falle pick and decoder for the fitchet 787 pump lock Figure 31-20 Falle decoder kit for the Mottura Serrablocca pump lock Figure 31-21 code finding key Figure 31-22 Decoders for the Abloy Disklock Figure 31-23 Falle decoder for the Abus Granit Disklock Figure 31-24 Abloy Disklock Pro decoder and key generation system Figure 31-25 R&D Briggs and Stratton sidebar decoder Figure 31-26 Decoding wafers within a sidebar lock Figure 31-27 Falle decoder system for laser-track locking mechanisms in automobiles Figure 31-28a Pin Lock Decoder Figure 31-28b Pin Lock Decoder Figure 31-29 Medeco cam lock configuration tryout keys Figure 31-30 Falle decoding system for Medeco sidebar locks Figure 31-31 Falle BiLock system Figure 31-32 HPC picking and decoding tool for axial locks

Figure 31-33a HPC "Peanut tool" Figure 31-33b HPC axial decoding and picking tools Figure 31-33c HPC axial decoder Figure 31-33d Moveable tynes within axial decoders Figure 31-33e Axial pick/decoder Figure 31-33f Moveable types within axial pick/decoder Figure 31-34 Chicago tubar lock Figure 31-35 Core shim decoder system Figure 31-36 Pressure sensitive conductive ink decoding system Figure 31-37 Logic circuit for the pressure sensitive decoder system Figure 31-38 Domains within the barium ferrite vinyl card Figure 31-39 Otoscope Figure 31-40 Ophthalmoscope Figure 31-41 Diagram of borescope Figure 31-42 Lens systems within the borescope Figure 31-43 Lengths of borescopes Figure 31-44 Olympus flexible borescope Figure 31-45 Olympus flexible borescope Figure 31-46 Internal view of a Ten-wafer lock Figure 31-47 Olympus borescope view Figure 31-48 Lead bearings within a combination lock Figure 31-49 SAIC portable x-ray unit Figure LSS+3101 John Falle pin and cam system principle Figure LSS+3102 British lever locks that can be decoded by Pin and Cam system Figure LSS+3103 European lever locks Figure LSS+3104 CISA double locking cylinder system Figure LSS+3105 MCM pin and cam key detail Figure LSS+3106 Chubb/Lips lever lock Figure LSS+3107 Ingersoll variable key system by John Falle Figure LSS+3108 Fichet Monopole lock Figure LSS+3109 Fichet H decoder system by John Falle Figure LSS+3110 Fichet H version sidebar detail Figure LSS+3111 Fichet H version sidebar detail Figure LSS+3112 John Falle Fichet Pump 787 decoder system Figure LSS+3113 Mottura key Figure LSS+3114 Abloy DiskLock models Figure LSS+3115 Chubb Ava padlock Figure LSS+3116 John Falle for Chubb Ava, variable key generation system Figure LSS+3117 John Falle Evva 3KS decoder system and lock Figure LSS+3118 John Falle Dom Diamond decoder system Figure LSS+3119 John Falle Dom diamond key bitting surface Figure LSS+3120 John Falle Vehicle decoder system for laser track locks Figure LSS+3121 John Falle Universal pin tumbler lock decoder Figure LSS+3122 John Falle Needle assembly for pin tumbler lock decoder Figure LSS+3123 Medeco ARX pins Figure LSS+3124 Medeco key tips for John Falle decoder system Figure LSS+3125 BiLock keys Figure LSS+3126 BiLock plug detail Figure LSS+3127 BiLock probes for John Falle decoder Figure LSS+3128 BiLock decoder system by John Falle Figure LSS+3129 John Falle Axira decoder system Figure LSS+3130 John Falle Picard decoder system Figure LSS+3131 Key turning system, available through John Falle Figure LSS+3132 Chubb Battleship Pin and Cam system by John Falle Figure LSS+3133 Ford Tibbe decoder, by John Falle Figure LSS+3134 Chubb AVA key Figure LSS+3135 Evva 3KS Pick and decode tool by John Falle

- Figure LSS+3137 John Falle Pin Lock decoder utilizing pin and cam technology Figure LSS+3138 The pick-probe tool for the advanced pin lock decoder tool Figure LSS+3139 The Var-Key system is incorporated within the advanced pin lock decoder by John Falle Figure LSS\_3140 BMW key decoder by Silca. Figure LSS+3141 Ford Galaxy wafers, showing indication of picking and decoding Figure LSS+3142 HPC and other produce a complete line of axial picks and decoders Figure LSS+3143 The Easy entrie profile milling machine can produce blanks from many sources Figure LSS+3144 The Easy entrie and Keyway King profile milling machines Figure LSS+3145 The Medeco M3 utilizes a slider to add another level of security Figure LSS+3146 The Medeco M3 slider is visible from outside of the plug Figure LSS+3147 Instakey mechanism, showing how the lock can be reprogrammed Figure LSS+3148 A comparison of Schlage Everest profiles Figure LSS +3149 A comparison of Schlage Everest keyways and the bypass of the undercut Figure LSS+3150 Mapping of a keyway from a digital image in the Easy entrie Figure LSS+3151 The Assa V10 7000 series sidebar lock Figure LSS+3152 Assa V10 use of balanced and unbalanced side millings Figure LSS+3153 Assa V10 multiplex sidebar codes Figure LSS+3154 Assa V10 sidebar code groups and keys
  - Figure LSS+3155 Assa V10 blocking method
  - Figure LSS+3156 Assa V10 individual sidebar coding
  - Figure LSS+3157 Assa V10 multiplex codes

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Figure LSS+3158 Assa V10 multiplex codes and groups

Discussion of endoscope and borescope. Courtesy of Hans Mejlshede.

The John Falle lever decoder system. Courtesy of Hans Mejlshede.

Bypass of laser track or sidewinder locks. Courtesy of Hans Mejlshede.

Master key records. Courtesy of Hans Mejlshede.

A discussion of reading the belly of a lever. Courtesy of Hans Mejlshede.

Forensic implications of the bypass of lever locks. Courtesy of Hans Mejlshede.

Forensic implications of picking or decoding the Abloy lock. Courtesy of Hans Mejlshede.

The A-1 GM 10 cut pick system, courtesy of Harry Sher.

Pick tools for the sidebar lock, courtesy of Harry Sher.

Reading a Chrysler lock with an EZ Reader tool, by Harry Sher

Decoding of keys, courtesy of Harry Sher.

The Peterson PRO-1 tool, courtesy of Harry Sher.

LSS301: Abus decoder, by John Falle

LSS301: European lever lock decoder, by John Falle

LSS301: Ford Galaxy decoding system, by John Falle

LSS302: Medeco lock decoding system, by John Falle

	LSS302: Universal pin lock decoder, by John Falle
	LSS302: European lever lock pick, by John Falle
	LSS302: Axira lock decoding system, by John Falle
	LSS302: BMW lock decoder system, by John Falle
	LSS303: Pin and cam system for CISA and other European locks, by John Falle
	LSS303: BiLock decoder system, by John Falle
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	LSS304: DOM Diamond decoder and pick system, by John Falle.
	LSS304: Chubb AVA pick and decoder system, by John Falle
	LSS305: EVVA 3KS pick and decoder system, by John Falle
	LSS305: Pin lock decoder system with pin and cam technology, by John Falle.
	LSS203: Matt Blaze on shimming a cylinder to determine all pin segments
(D	LSS203: Brian Chan on TMK extrapolation
	LSS203: Harry Sher on the decoding of a top level master key
	LSS203: Matt Blaze on the extrapolation of a top level master key
Þ	LSS203: Harry Sher on covert methods of entry
	LSS204: Harry Sher on picking axial pin tumbler locks
	ter 32 Destructive Entry: Tools and Techniques
	e 32-1 Sigma (UK) forced entry tools e 32-2 Hole saw used to remove the plug from a cylinder
	22-3 Drilling the retaining scrows

- Figure 32-3 Drilling the retaining screws
- Figure 32-4 Drilling the shear line
- Figure 32-5 Drilling through the plug
- Figure 32-6 Slam-hammer

- Figure 32-7 Pulling force on padlocks
- Figure 32-8 Using a metal screw to pull a plug or cylinder
- Figure 32-9 Dent puller kit
- Figure 32-10 Different examples of dent pullers
- Figure 32-11 European style dent puller with spacer

Figure 32-12 Dent pullers Figure 32-13 Torsion and twisting Figure 32-14 Pipe wrench or channel lock pliers Figure 32-15 Profile cylinder removal tool Figure 32-16a Sigma profile cylinder removal tool Figure 32-16b Sigma profile cylinder removal tool Figure 32-17 Chubb forcible entry tools Figure 32-18 Iowa American forcible entry tools Figure 32-19 Sigma Highway Hooligan pry bar tool Figure 32-20 Sigma Hooligan Figure 32-21 Jamb spreading Figure 32-22 Hacksawing the bolt Figure 32-23 Omni hydraulic jamb spreader Figure 32-24a Iowa American Hydra-Force hydraulic jamb spreader Figure 32-24b Iowa American Hvdra-Force tools Figure 32-25 Sigma hydraulic jamb spreader Figure 32-26 Jaws of Life Figure 32-27 Sigma hydraulic spreaders and rams Figure 32-28 K-tool Figure 32-29 Sigma ram and duckbill tools Figure 32-30 Wedging a lock Figure 32-31 Compression or shear force Figure 32-32 Applying shock to bolt Figure 32-33 Spring biased tool for shattering glass Figure 32-34 Sigma air-bag system Figure 32-35 Axe and sledgehammer Figure 32-36 Sigma two-man battering ram Figure 32-37 Sigma battering ram Figure 32-38 Sigma hinge removal tool Figure 32-39 Broco portable thermic lance Figure 32-40 Broco thermic lance Figure 32-41 Marks from a dent puller Figure 32-42 Shove-knife Figure LSS+3201 Sigma Baby ram

Figure LSS+3201 Sigma Baby ram Figure LSS+3202 Explosive Wall Breaching System Figure LSS+3203 Sigma Firecracker ram Figure LSS+3204 Sigma Mitts Figure LSS+3205 Sigma Ripper Figure LSS+3206 Power actuated tool

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Figure LSS+3207 External - Right hand inward opening timber door with standard Yale type lock; Internal - Left hand inward opening steel gate in confined area armed with single deadlock. Courtesy Ian Bauchop.

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Figure LSS+3208 External - Left hand outward opening solid timber door with two locks; Internal - Left hand inward opening steel grille. Confined space with one deadlock and two sliding bolts

Figure LSS+3209 Internal concertina mild steel window grilles behind 6 mm float glass casement window

Figure LSS+3210 Right hand inward opening solid timber door with multipoint locking system

Figure LSS+3211 External - Right hand outward opening steel gate, slightly recessed with single lock and cover plate lock side on two rising butt hinges; Internal - Right hand inward opening timber door

Figure LSS+3212 External - Steel cage protecting front door with right hand outward opening single lock with now covi plate. External steel grilles protection windows; Internal - Inward opening solid timber door

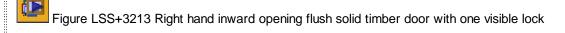


Figure LSS+3214 Internal view of LSS+3213 detailing timber braces and additional deadlock and night chain

Figure LSS+3215 Right hand inward opening solid timber door with four individual locks. Attack made with chain saw c hinge side

Figure LSS+3216 External - Right hand opening steel gate with single lock, full cover plate and rising butt hinges; Inter Right hand outward opening solid timber door, locks unseen

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Figure LSS+3217 External - Right hand outward opening steel gate, single lock, no cover plate and standard butt hinge Internal - Right hand inward opening solid timber door, one lock visible

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Figure LSS+3218 External - Right hand outward opening timber and glass door with single lock; Internal - Right hand opening timber and glass paneled door with two locks

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Figure LSS+3219 Recessed Left hand inward opening solid timber door with multilocking system, set in steel frame pluadditional top lock

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Figure LSS+3220 External - Flush with building right hand outward opening steel paneled gate with steel mesh and full cover plate; Internal - Standard timber door with glass panel



Figure LSS+3221 Left hand outward opening recessed solid timber fire door with steel panel



Figure LSS+3222 External - Heavy duty right hand outward opening steel gate proud of building line with single lock an cover plate; Internal - Right hand inward opening timber door, locks unseen



Figure LSS+3223 External - Recessed right hand outward opening steel gate with three standard butt hinges and no c strip; Internal - Right hand inward opening timber paneled door with two locks visible

- Figure LSS+3224 A sigma forced entry team shows the technique for breaching a door.
- Figure LSS+3225 MSC Lock Force tool is similar to that produced by SIGMA

Figure LSS+3226 There are various dies for the MSC LOCK FORCE tool to fit different profiles

- Figure LSS+3227 The use of the MSC LOCK FORCE tool is straightforward
- Figure LSS+3228 The BROCO thermic lance is a small self contained package
- Figure LSS+3229 The BROCO control nozzle and chemical self starter for the thermic lance
- Figure LSS+3230 The KIBB security lock and strike system makes bypass difficult

Figure LSS+3231, an attack on a file cabinet safe with a variety of tools.

Figure LSS+3232 A hole saw can be used to ream out the entire plug.

- Figure LSS+3233 A new shear line is created by drilling the plug.
- Figure LSS+3234 The mounting for the cylinder is cast and can be fractured, allowing removal of the lock.
- Figure LSS+3235 Knob locks should not be used as the sole protection on exterior doors.
- Figure LSS+3236 Rim locks must be mounted properly to increase their resistance to attack.
- Figure LSS+3237 Cylinders can be pried loose if not mounted properly.
- Figure LSS+3238 The cylinder was pounded through the mounting.
- Figure LSS+3239 A pipe wrench can be utilized to twist loose a key-in-knob or cylinder lock.

Figure LSS+3240 The ease by which a cylinder can be removed by shearing the setscrew.

Cylinders can be forcibly removed by applying torque and destroying internal setscrews. The setscrews can also be removed during business hours to allow the cylinder to be unscrewed at a later time. Courtesy of Don Shiles.

- (D
- A wrench attack on cylinders can be very effective. Courtesy of Don Shiles.
- Figure LSS+3241 A diagram showing the principle of jamb spreading.
- Figure LSS+3242, Examples of burglary tools found at the scene of a safe job.

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Cylinders can be forcibly removed by applying torque and destroying internal setscrews. The setscrews can also be removed during business hours to allow the cylinder to be unscrewed at a later time. Courtesy of Don Shiles.

- Figure LSS+3243, a special drill bit for removing plugs, called a rotary pick.
- Figure LSS+3244 A lock can be drilled by raising all drivers above shear line.
- Figure LSS+3245 A lock can be drilled to create a new shear line.
- Figure LSS+3246 A lock can be drilled and then shimmed with a fine wire.
- Figure LSS+3247 Peterson Manufacturing IC removal tool
- Figure LSS+3248 The Stealth Lock Systems tool to open Medeco cam locks

Sigma analysis of the Kibb interlocking strike plate, with Ian Bauchop.

Demonstration of different forced entry techniques on doors utilizing the Kibb interlocking strike plate design.

A wrench attack on cylinders can be very effective. Courtesy of Don Shiles.

Forensic evidence of forced entry. Courtesy of Hans Mejlshede.

Opening a padlock by bouncing the locking dog. Courtesy of Don Shiles.

- A discussion of covert entry by Harry Sher
  - A discussion of GSA containers and covert entry, by Harry Sher

A discussion of surreptitious entry and government containers, by Harry Sher

The use of the nose puller, courtesy of Harry Sher.

- LSS201: MSC Lock Force tool, courtesy of MSC
- LSS201: Forced entry tools produced by Sigma. Courtesy of Ian Bauchop.
- LSS202: Broco Thermic lance description and use, by Tom Joos.
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LSS101: Discussion of safe design by Bill Sherlock.

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  - LSS201: Forensics and locks, Courtesy of Bill Sherlock.
  - LSS202: Steve Mattoon on the use of explosives to gain entry.
  - Use of the change-key hole for reading wheels, by Harry Sher
- LSS204: Owe Bengtsson on opening safes
- LSS204: Owe Bengtsson introduction to opening safes

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Use of ultra violet to determine which keys have been depressed on a keypad. Courtesy of Don Shiles.

LSS201: Mark Bates on Manipulation

LSS201: Mark Bates on the Soft Drill

A discussion of Mas-Hamilton and the Soft Drill, by Harry Sher

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Hinges and forensic evidence. Courtesy Don Shiles.

Case example: removal of sliding glass door. Courtesy of Don Shiles.

LSS202: Ross Anderson on biometrics

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