

Comprehensive Error/Variety Checklist

compiled by Mike Diamond

ES=Errorscope

Part I. Die Subtypes

Design errors, e.g.

1817 large cent with 15 stars

1826 half cent with 12 stars

Misspellings (foreign only)

Fouled-up design, e.g.

Italy 1000 Lire with outdated map borders

Canadian \$5 Olympic Coin. Runner with two left feet.

Part II. Die Varieties

Broken hub

Broken punch

Doubled dies (incl. tripled dies, etc)

Rotated hub doubling (Class I)

175 degree rotation (ES, July/August 2003)

Distorted hub doubling (Class II)

Design hub doubling (Class III)

Offset hub doubling (Class IV)

Pivoted hub doubling (Class V)

Distended hub doubling (Class VI)

Modified hub doubling (Class VII)

Tilted hub doubling (Class VIII)

Single-squeeze doubled dies (often attributed to Class VIII)

Repunched date (incl. blundered dates)

Wrong digits punched in

Misplaced date

Misplaced mintmark

Dual mintmark

1980 D & S cent (recently delisted)

1956 D & S cent (recently debunked)

Inverted mintmark

Horizontal mintmark (inevitably repunched)

Tilted mintmark

- Repunched mintmark
- Overmintmark (e.g. 1944-D/S cent)
- Other repunched or re-engraved design elements
 - Denomination
 - Letters
 - Assay value
- Omitted mintmark (e.g. 1982 no-P dime)
- Omitted date (foreign only)
 - Other omitted design elements
- Large and small mintmark varieties
- Different mintmark styles
- Overdates
 - Caused by repunching
 - Caused by second hubbing with die of different date (Class III doubled die)
- Wrong date
 - Date later than final date of issue (e.g., 1913 Liberty Head nickel)
 - Date earlier than first date of issue (e.g., 1954 Mexico 5 centavos – small size)
 - Wrong digits (e.g., 1393/1893 Peruvian peso)
 - Transposed digits

Part III. Die Installation Errors

- Mules
 - Different denominations
 - Cent/dime mules (3 –4 known, each unique)
 - Quarter/Sac dollar mules (3 die pairs)
 - Two-headed
 - 1859 Indian cent (unique)
 - 1982 Jamaica 1c (also comes in a two-tailed version)
 - Two-tailed
 - Two-tailed quarter (2 specimens, probably from 1965)
 - Two-tailed dime (1 specimen, probably from 1965)
 - Different countries
 - New Zealand 2c / Bahamas 5c (1967)
 - Coin matched with medal die
 - Canada “map mule”
 - Double mules
 - Maryland obverse and reverse dies on Sac planchet in Sac collar (unique)
 - Temporal mules (e.g., 1964 Austria 25 schilling)
 - Transitional mules
 - 1959 wheatback cent (controversial)
 - 1942-S nickel with small S-mintmark to right of Monticello (unique)
- Mismatched business / proof dies

1999 \$5 and \$10 gold eagles struck with unfinished proof dies (W mintmark)
Business strike cents with proof-style reverse
Proof cents with business-style reverse

Finished proof die matched with business die (foreign only)

Minor transitional mismatches, e.g.:

1939 nickel with reverse of 1938
1940 nickel with reverse of 1939
1963 quarter with reverse of 1964
1964 quarter with reverse of 1963

Part IV. Die Errors

Inverted die installation (not an error)

Older issues struck with inverted dies (e.g. buffalo nickels and Mercury dimes)
Recent installation of inverted dies (beginning 1992)

Rotated die errors

Rotated die due to improper installation
Rotated die due to improper die preparation (e.g., grinding flats in wrong spot)
Rotated die due to movement after installation

Reeding vs. no reeding varieties (foreign only)

Security edge errors (foreign only)

Security vs. no security edge
Security edge too high or too low
Interrupted security edge design
Tilted security edge design

Concentric lathe marks (ES, Nov/Dec 2003)

e.g., some 1996 cents

Excessively deep rim gutters

e.g., some 1996 cents

Rockwell test mark left in die (bump seen on coin) (ES, July/Aug 2006)

Collar manufacturing errors

Excessively wide collar (ES, Nov/Dec 2002)
Created by wrong broach

- Improper use of correct broach
- Widening due to wear
- Abnormal reeding, e.g:
 - 1921 Morgan dollar with infrequent reeding
 - 1924-D Mercury dime with infrequent reeding
 - Recent examples of abnormal reeding

Collar installation errors

- Smooth edge instead of reeded edge (and vice versa)
- Smooth edge instead of security edge (and vice versa)
- Reeded edge instead of security edge (and vice versa)

Die retouching, e.g.:

- Re-engraved "AW" mintmark on 1944-D half dollar
- Re-engraved front of Lincoln's coat (1953 proof cent)

Die damage (ES, Nov/Dec 2003, Jan/Feb 2003)

- Die dents (ES, Nov/Dec 2004, July/August 2005, Nov/Dec 2005)
- Die scrapes
- Accidental die scratches
- Die gouges
- Impact scars
- Accidental die abrasion
- Peripheral die damage (ES, March/April 2005)
- Die attrition errors (ES, May/June 2003, March/April 2005)
- Catastrophic die damage (ES, March/April 2002)

Hubbing-induced deformation

- Wavy steps (Lincoln cents only) (ES, July/Aug 2006, Nov/Dec 2006)
- Trails (ES, Sept/Oct 2006, Nov/Dec 2006)

Collar damage

Clashed dies (ES, March/April 2002)

- Chatter clash (multiple staggered clash marks)
- Double clash with reciprocal counterclash (ES, Nov/Dec 2004)
- Misaligned die clashes (ES, May/June 2004, July/August 2004)
 - Horizontally misaligned die clash
 - Vertically misaligned (tilted) die clash
 - Pivoted die clash
- Mule clash errors, e.g. (ES, July/August 2002)
 - 1864 2c reverse die clashed with Indian cent obverse die
 - 1857 1c obverse die clashed with seated 50c obverse die
 - 1857 1c obverse die clashed with seated 25c reverse die
 - 1857 1c obverse die clashed with Liberty \$20 obverse die

Collar clash

- Hammer die

- Anvil die (uncommon)

Die damage with design transfer

- Collision with die fragments (“floating die clash”) (ES, May/June 2002, May/June 2005)

- Category B: Counterclash (ES, May/June 2002, July/August 2002, Sept/Oct 2002)

- Category C: Miscellaneous and unexplained forms of design transfer/duplication

Die deterioration/deformation errors

- Severe die wear

- Radial flow lines

- Concentric flow lines (uncommon)

- Die deterioration doubling

- Incuse die deterioration doubling (uncommon)

- “Blebs” or “patches” of die erosion (ES, July/Aug 1998)

- Progressive, indirect design transfer

- Common in 1946-S and 1948-S cents

- Soft die errors (ES, July/Aug 2001, Nov/Dec 2001)

- (premature, localized, exaggerated, and peculiar patterns of deformation)

- e.g., 1943-S “goiter neck quarter”

- “Ridge rings” on copper-plated zinc cents

- Well-defined rings on Euro coins (ES, Sept/Oct 2006)

- Die subsidence (ES, July/August 2004, Nov/Dec 2004)

- e.g., 1924-S “goiter neck cent”

- Co-occurring with split dies

- Design creep

- In late die state 1979 dimes and 1982 quarters

- “Starburst” pattern of radial streaks on Sacagawea dollars (cause uncertain)

Intentional die abrasion (“die polishing”)

- Severe die abrasion

- Loss of design elements

Die breaks

- Cuds

- Ovoid (typical) cuds

- Crescentic cuds (ES, March/April 2005)

- Circumferential cuds (ES, March/April 2005)

- Rim-to-rim cuds (ES, May/June 2003)

- Retained Cuds (ES, Jan/Feb 2006)

- Anvil die

- Hammer die

- Cud sinks in

- Cud protrudes beyond die face (rare)

- With vertical displacement
- With horizontal offset
- With lateral spread
- Interior (internal) die breaks (ES, May/June 2003)
 - Connected to die cracks or splits
 - Freestanding (ES, May/June 2005)
- Retained interior die breaks (ES, July/August 2004)
 - Connected to die crack or split
 - Freestanding
- Rim cuds
- Die chips
- Catastrophic die failure (ES, May/June 2007)
- Spontaneous breaks
- Breaks produced by impacts

- Collar cuds (collar breaks)
 - Complete collar break (abrupt loss of entire arc segment)
 - Irregular collar break
 - Chipped collar
 - Vertical collar crack
 - Horizontal collar crack (theoretical only)
 - Retained collar cud
 - Rotating collar cud (ES, July/August 2003)
 - Unilateral split collar (theoretical only)
 - Bilateral split collar

- Die cracks
 - Rim-to-rim
 - Curved rim-to-rim (“pre-cud”) (ES, Jan/Feb 2006)
 - With lateral spread
 - Blind-ended
 - Bi-level die cracks (ES, July/August 2004)
 - Shattered die (ES, Jan/Feb 2006, May/June 2007)
 - Two or more splits in die
 - Numerous wide, intersecting, raised die cracks
 - Numerous intersecting bi-level die cracks
 - Various combinations of brittle fracture

- Split dies (ES, Jan/Feb 2006)
 - Median (bisecting) split die
 - Asymmetrical split die

Part V. Planchet Errors

Alloy errors

- Improper alloy mix
 - Poorly mixed alloy
 - Incorrect proportions of metals
- Gas bubbles
 - Intact
 - Popped
- Slag inclusions (ES, May/June 2006)
- Intrinsic metallic inclusions (ES, Sept/Oct 2006)
- Lamination errors
 - Loss before strike
 - Loss after strike
 - Lamination cracks
 - Retained laminations
 - Folded before strike
 - Laminations in clad coins
- Split planchets
 - Before strike
 - After strike
 - Struck with another planchet on top or beneath
 - Split core (clad coins)
- Clamshell splits
 - Clamshell folded over before strike
- Cracked planchets
- Broken planchets / coins
 - Before strike
 - After strike
- Brittle coins (cross-classified with annealing errors)
- Bubbled planchets
- Crumbling planchets
- Ragged clips
- Ragged notch
- Ragged perforations ("blowholes")
- Fissures -- ragged and smooth
- Other alloy errors

Rolling Mill Errors

- Rolled-thick planchets
- Rolled-thin planchets
- Tapered planchets
- Rolling indentation (ES, Jan/Feb 2000)
- Rolled-in scrap (ES, May/June 2006)

Blanking and Cutting Errors

- Curved clips

- Crescent curved clips
- Bowtie clips (ES, Nov/Dec 2005)
 - Two large clips at opposite poles
 - Four clips, punching through previously punched strip
 - Struck chopped webbing
- Straight clips
 - Smooth straight clips
 - Irregular straight clips
 - Sawtooth clips
 - Incomplete straight clip (most likely just cuts from guides)
- Corner clip ("outside corner clips")
- Assay clip ("inside corner clip") (cross-classified with pre-strike damage)
- Ragged clips (also listed under alloy errors)
- Incomplete punch (incomplete clip) (ES, May/June 2005)
- Elliptical clips (ES, May/June 2005)
- Multiple clips and combination clips
- Blanking burr ("rolling fold") (ES, Jan/Feb 2007)
- Punched-in scrap (ES, May/June 2006)

Upset Mill Errors

- Coins struck on Type I blanks
- Coins struck on minimally upset planchets (ES, July/August 2005)
- Coins struck on planchet that's too upset
- "Groovy edge" (possibly from worn groove)
- Variation in cross-sectional shape of groove on unstruck planchet
- Rim burrs (cross-classified with pre-strike damage)
- Struck coin sent back through upset mill
- Abnormal upset (ES, Sept/Oct 2005)
 - Wide, flat edge
 - Smoothly convex edge
 - Abnormally wide proto-rim
- Squeezed-in debris (ES, May/June 2006)

Annealing Errors

- Excessive and/or prolonged heat (replaces "sintered plating" and "copper wash")
 - Black, brown, red, coppery discoloration (includes "black beauty" nickels)
 - Layer of copper, often peeling
- Poorly annealed or unannealed planchets (hard, brittle planchets)
- Brittle coins (cross-classified with alloy errors)
- Unexplained planchet hardness
 - 1954-S nickels

Miscellaneous forms of discoloration

Plating Errors

- Incomplete plating

- Unplated cents
- Thin plating
- Thick plating
- Blistered plating
- Brassy plating
- Split and peeling plating

Bonding/Bonding Mill Errors (ES, Sept/Oct 2002)

Missing clad layer

Full

- Before strike

- After strike

- Before bonding mill (full weight) (ES, Sept/Oct 2002, Nov/Dec 2006)

Partial

- Before strike

- After strike

- Before bonding mill

Thin cladding

- With gaps

Missing both clad layers

- Core thickness (ES, Sept/Oct 2003)

- Full thickness

Struck Clad layers

- Split off after strike

- Split off before strike

 - Struck by itself

 - Struck on top or beneath a normal planchet

Clamshell separation

- Clad layer folded over

Missing core

- Partial

- Full

Copper-and-zinc composite "shells" (ES, May/June 2001)

- Split-after-strike

Irregular planchets

Scraps

- Normal alloy/composition

- Off-metal

 - Feeder finger material

 - Foil

- Ragged clip (cross-classified with alloy errors)

- Ragged notch (cross-classified with alloy errors)

- "Blowholes" (cross-classified with alloy errors)

- Fissures (cross-classified with alloy errors)

Cracked planchets (cross-classified with alloy errors)
Other

Pre-strike damage

Assay clip (cross-classified with blanking errors)
Rim burrs
Accidentally and intentionally “resized” planchets
“Cutmarks” (mostly found on off-metal errors – 5c/1c, 5c/10c)
Other forms of pre-strike damage
 Gouged
 Crushed
 Scraped
 Torn
 Crumpled
Rockwell test mark in planchet (circular dimple) (ES, July/Aug 2006)

Wrong planchet and off-metal errors

Wrong planchet, correct composition
Off-metal
 Domestic
 Foreign
 Unidentified origin (orphan) (ES, Sept/Oct 2006, Nov/Dec 2006)
Pure copper quarters and dimes (covered under bonding mill errors)
Pure clad dime (covered under bonding mill errors)
Wrong stock errors
 Correct composition
 Off-metal (e.g, nickel struck on clad quarter stock)
Business strike on special off-metal planchet (e.g., silver Ikes)
Business strikes on proof planchets
Proof strike on business planchet
Wrong date error (covered under mules and die manufacturing errors)
Double denomination errors
 Same year
 Different year
Dual country
 Same year
 Different year
Intentional overstrikes (not an error)
Transitional errors ("wrong series") (ES, Sept/Oct 2001)
Struck on smaller planchet or coin
Struck on same size planchet or coin
Struck on larger planchet or coin
 1981 cent on nickel planchet, uniface reverse
 1981 dime on cent cap
 Canadian "assisted errors" 1977 - 1981
Struck on loose clad layer (covered under bonding mill errors)

Weld seam planchets
Coins struck on washers, gears, and other hardware
Coins struck on “aluminum” feeder fingers
Experimental issues:
 State quarters on experimental alloys – tests for Sacajawea dollar
 1974 aluminum and plated steel cents

Part VI. Striking Errors

Unstruck blanks (“Type I”)
Unstruck planchets (Type II)

Die alignment errors

 Horizontal misalignments

 Hammer die

 Anvil die (ES, Sept/Oct 2004, March/April 2005)

 With misaligned collar

 With broken collar

 Vertical misalignments (ES, Jan/Feb 2003, Sept/Oct 2003)

 Hammer die

 Anvil die

Rotated dies (also covered under die installation errors)

 Improper installation

 Improper guide marks on die

 Loose fit, sometimes with subsequent re-tightening in wrong position

Pivoted die error (probably involved entire die assembly)

Misaligned collar

 Associated with misaligned anvil die

 Associated with ram strike

 Associated with elliptical strike clip

Collar deployment errors

 Partial collar

 Flange with bevel

 Flange without bevel

 Tilted partial collar

 Reversed partial collar (not an error)

 High deployment of collar with coin metal extruded beneath

 Broadstrikes

 Centered

 Uncentered

 Cupped broadstrikes

 Forced broadstrikes

 Partial collar broadstrikes

 Stiff collar errors (ES, Nov/Dec 2000)

- Strong collar scar
- Strong collar scar with cupping
- Ram strike (ES, Nov/Dec 2000, March/April 2001)
- Elliptical strike clip (ES, March/April 2000)

Weak Strikes (ES, Sept/Oct 2000)

- Caused by insufficient die approximation

- Caused by abnormally low ram pressure

- Invisible strikes (ES, March/April 2003, Nov/Dec 2003, March/April 2004, Nov/Dec 2006)

- With indent

- With partial brockage

- With strike-through error

- Followed/preceded by strong strike

Abnormally strong strikes

- Due to abnormally high pressure setting

- Finning

- Extremely large broadstrikes

- Extreme stretch strikes with both sides die-struck

- Due to stacked coins or planchets

- Due to die tilt

Stutter Strikes (ES, Nov/Dec 2001, Sept/Oct 2007)

- Due to planchet flexion (associated with indents and brockages)

- Due to upward-facing bend in planchet produced by strike

- Due to die instability

- Due to spasmodically collapsing collar

- Due to contact with bent planchet/coin

Machine doubling (a.k.a. machine doubling, machine doubling damage, machine damage doubling, mechanical doubling, strike doubling, shift doubling, ejection doubling) (ES, July/Aug 2006)

- “Push doubling” (marginal shelving and sharp interior duplication)

- “Slide doubling” (smear design)

Rim-restricted design doubling (cause uncertain)

- 2004 cent (ES, March/April 2007)

- Presidential dollars (ES, Sept/Oct 2007)

Design scraped clean by die movement on second strike

One-sided multi-strikes (ES, March/April 2000, Jan/Feb 2002, July/August 2003)

- Hammer die rotated

- Instantaneous

- Gradual

- Hammer die misaligned
 - Instantaneous
 - Gradual

- Off-center strikes

- Cupped off-center strikes

- With collar scar

- Without collar scar

- Uniface strikes

- Stretch strikes

- Uniface

- Die struck on both faces (covered under high pressure strikes)

- With unexplained dents at opposite pole (not "sideneck strike")

- Chain strikes

- Normal chain strikes with straight edge

- External chain strikes (ES, Jan/Feb 2003)

- Concave, convex and irregular chain strikes (ES, Jan/Feb 2001, July/August 2002)

- Wraparound strikes (theoretical, so far)

- Edge of off-center coin wraps around obstruction on die face.

- Saddle Strikes

- Hump present

- Hump absent

- Die position

- Head to head

- Head to base (early to mid- '70s)

- Gap between adjacent dies

- Narrow

- Wide

- Sideneck strikes ("one-die saddles")

- (Expanding planchet collides with side of die neck)

- Broadstrikes (covered under collar deployment errors)

- Foldover Strikes (ES, July/August 2007)

- Out-of-collar

- In-collar

- With edge strike persisting

- On struck cents (normal and error)

- Double foldover strikes (Z-fold)

- Axial fold

- Paraxial fold

- Inward fold

- Outward fold

Edge Strikes

- Flat

- Bent

- With off-center strike produced by continuation of downstroke

Extrusion strikes (an effect, not an independent error) (ES, March/April 2004)

- With indents and partial brockages

- With strike-through errors

- Other

Multiple strikes

- On-center/Off-center

- In-collar/out-of-collar

- Flipover

- Numerous closely-spaced strikes (ES, Nov/Dec 2004)

- Delayed second strikes (ES, July/August 2007)

Indents

- Full/partial

- In-collar/out-of-collar

- Full

- Centered

- Uncentered

- "Internal" indents

- On obverse

- On reverse

- Multiple indents

- Irregular indents

- Produced by error coins

- Coins struck through clipped planchets

- Indents by smaller planchets

Brockages

- Full/Partial

- In-collar/Out-of-Collar

- Full

- Centered

- Uncentered

- From another, smaller denomination

- From another error coin

- Flipover brockage

- On obverse

- On reverse

- Aligned brockages (ES, May/June 2005)
 - From partial die caps
 - From elliptical clip coin
 - From elliptical strike clip coin
- First-strike brockages
 - "Mirror" brockages (unexpanded, undistorted)
 - Distorted first-strike brockages
- From another denomination (ES, May/June 2005)
- Mid-stage and late-stage brockages
- By struck fragment
 - Aligned with opposite, die-struck design
 - Not aligned with opposite design
- From struck die fill (very rare)
- Multiple brockages
 - From multiple strikes
 - From shifted, early die cap
 - From multi-struck coin
- Rotated brockages (relative to die-struck design)
- Clashed cap strike
 - Affecting a late-stage cap
 - Affecting a uniface cap
 - Affecting an early stage die cap
 - Affecting a cap that was striking counterbrockages

Counterbrockage

- Full/Partial
- In-collar/Out-of-collar
- Counterbrockage of obverse on obverse
- Counterbrockage of reverse on reverse (rare)
- Flipover counterbrockage
- Early, mid-, and late-stage counterbrockages
- From another error coin
- "Brockage-counterbrockage" (4 types)

Die caps

- Obverse die caps
 - Raised reverse design
 - Brockage on reverse face
 - Uniface die caps
 - Complex die caps
- Reverse die caps
 - Centered
 - Uncentered
 - Cupped toward anvil die, reverse die, or expansion in horizontal expansion
- Partial die caps
- Caps with and without cupping

Cupping with and without being a cap
Detached cap bottoms (ES, March/April 2001, May/June 2001)

Capped die strikes (without identifiable images)

- Through uniface cap
- Through late-stage die cap
- Through cap-like obstruction

Capped die doubling (ES, Sept/Oct 2005)

- Shifted/rotated cap strikes (ES, May/June 2000)
 - Normally oriented incuse design elements
 - Multiple incuse elements (due to several shift-and-strike events)
 - Unexplained raised doubling
- Expansion ripples (ES, July/Aug 2000)
- Incuse doubling surrounding raised elements
- Other forms of capped die doubling

"Struck-through" errors

- Struck through fragment
- Struck through clipped planchet (ES, Sept/Oct 2002)
- Struck through thin struck fragment
 - Face-up (normal-incuse design elements)
 - Face-down (mirror image design elements)
- Struck through clad layer
 - Struck through struck clad layer
- Struck through loose reeding
- Struck through split planchet
 - Obverse
 - Reverse
- Struck through feed finger (ES, Nov/Dec 2005)
- Struck through die fill
 - "Grease strikes"
 - Many kinds of die fill and resulting textures
 - Struck through smooth, viscous material (grease, oil)
 - Silvery, flaky die fill (some state quarters)
 - Black, crusty die fill
 - Doubling associated with (ES, March/April 2006, July/August 2006)
- Struck through miscellaneous foreign matter
 - Metal dust, shavings
 - Thread
 - Cloth
 - Wire
 - Feeder finger
- Split or torn in two by struck-thru object
- Dropped fillings (ES, May/June 2003)
 - Retained dropped fillings

- Retained strike-thrus (struck-in errors)
 - Embedded dropped fillings (see above)
 - Scrap metal
 - "Staples" (carding brush bristles)
 - Plastic
 - (associated with bullion coins)
 - Metal foil
 - (associated with dimes and nickels)
 - Rubbery material
 - Other
- Filled dies
 - Single design elements
 - Multiple design elements
- Filled collar /obstructed collar (ES, Jan/Feb 2006)
 - With flange
- Surface film effects (ES, May/June 2002)
 - Surface film doubling
 - Surface film "afterimage"
 - Surface film transfer
 - Surface film transfer with clash marks

- Uniface strikes
 - In-collar
 - Out-of-collar (crosss-classified with indents)
 - Centered
 - Uncentered

- Sandwich strikes
 - Partial
 - Full
 - Between two struck coins
 - Between two planchets
 - Between a coin and a planchet

- Nested coins

- Mated pairs

- Bonded coins

- Pile-ups

- Ram strikes (see stiff collar errors) (ES, Nov/Dec 2000)
 - Normal die installation (pre-1997)
 - Inverted die installation (post-1997)

Association with misaligned dies
Association with misaligned collar

Strike clips (ES, July/Aug 1999, May/June 2001)

Conventional strike clips
Elliptical strike clips
Saddle strike/strike clips
"Pinch clips"
Other

Detached reeding

From forced broadstrikes
From ram strikes
Other

Coin shrapnel ("breakaway fragments")

Angular pieces
Roughly circular pieces
Semilunar pieces
Other shapes

Cupping

With and without collar scar
In a single strike
Caps without cupping
Cupping toward hammer die
Cupping toward anvil die
Expansion in horizontal plane

Bimetallic errors (foreign only) (ES, Nov/Dec 2005)

Misaligned core (ES, May/June 2007)
Misaligned core hole (ES, Sept/Oct 2007)
 Well-seated core
 With misaligned core
Double-punched hole
Unpunched hole
 Solid disc of ring metal
 Solid disc of ring metal with embedded core
 Solid disc of ring metal with core indent
Ring with incomplete punch
Core with incomplete punch
Struck outer rings (ES, Jan/Feb 2007)
Struck cores (ES, Nov/Dec 2006)
Wrong core inserted
Wrong ring (ES, March/April 2007)
Struck ring from another country (restruck)

- Struck core from another country (restruck)
- Abnormally small core (controversial)
- Abnormally wide hole (controversial)
- Abnormally thin core
- Abnormally thick core
- Abnormally thin ring
- Abnormally thick ring
- Tri-laminar core missing a layer
- Core punched out of ring strip
- Ring punched out of core strip

Multi-sided coins (foreign only)

- Malrotation
 - Broadstruck
 - Ram strike

Part VII. Post-Strike Mint Modifications

Mispunched center holes (foreign only)

- Off-center
- Double punched center holes
- Irregular center holes
- Unpunched center holes

Edge lettering applied after strike (incuse)

Edge lettering errors (incuse letters)

- Omitted lettering
- Vertically misaligned letters (cut off at top)
- Vertically misaligned letters (cut off at bottom)
- Wrong spacing between incuse design elements
- Obliquely-oriented lettering
- Overlapping letters
- Two sets of letters
- Skipped letters
- Letters on wrong planchet
- Chipped letter
- Lightly impressed letters
- Incomplete letters
- Smearred letters

Post-strike chemical treatment

- Experimental rinse on Sacagawea dollars

Part VII. Post-strike die contact

Ejection impact doubling (post-strike design transfer from die) (ES, Jan/Feb 2005)

Part IX. Post-strike mint damage

Pseudobroccage (false broccage) (ES, Nov/Dec 1999)

Fused coins

Folded, crushed, etc.

Part X. Wastebasket/Composite Categories

Ghost images

Progressive, indirect design transfer

Worn clash marks

Thin planchets

Split planchets

split-before-strike

split after-strike

Coins thinned by strike(s)

Weak strikes

High pressure strikes

"Greasy ghosts"

Surface film afterimage

Surface film transfer

Split-line afterimage

Other causes

Doubling

Die Deterioration Doubling

Machine Doubling

"Abrasion doubling" (largely a myth)

Incuse doubling in plated coins

Split-line doubling

Surface film doubling

Doubling associated with grease strike

Other forms of doubling