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| This checklist is my attempt to compile a comprehensive listing of all known variety and error types, subtypes, and associated effects. While the traditional planchet-die-striking method of classification hasn't been completely abandoned, it has been absorbed into a much more detailed and precise taxonomy. This is intended to reflect the numerous steps (and mis-steps) in the minting process that generate the great diversity of anomalies presented here. Many of the categories will be familiar to veteran collectors. Others will perhaps be dimly recalled, while others will be unfamiliar. Many of the more obscure error types have been treated in detail in articles published in *Errorscope*. These articles are referenced next to the appropriate entry (“ES”). Other treatments can be found in Coin World (“CW”). I have tried to restrict this checklist to basic error/variety types and subtypes. Combination errors have been kept to a minimum. Had I attempted to incorporate all conceivable two-error combinations, this would have generated almost half a million entries. That would have been both unwieldy and unnecessary. This checklist is a continually evolving project. Updated editions are posted on the CONECA website at odd intervals. Thumbnail illustrations are planned for the next edition. The ultimate goal is to use this checklist as the nucleus for a massive encyclopedia. |

ES=*Errorscope*

*CW=Coin World*

**Part I. Design Subtypes**

**Design subtype**, e.g.

 1817 large cent with 15 stars

 1828 half cent with 12 stars

 Seated Liberty dimes and half dimes, with and without arrows in same year

 Prototypes and patterns released into circulation

 1916 Liberty Head (“Mercury”) dimes

 1971 Eisenhower dollar prototype (CW 9/29/08)

**Minor mid-year design modification**, e.g.

 Denomination changed from raised to recessed in 1913 “buffalo” nickel

 Naked breast covered in armor in 1917 Standing Liberty quarter

 Change from 1960 small date to large date cent

**Conceptual design flaw (foul-up design or in translating design to master hub or master die)**

 Misspellings (foreign only)

 Inaccurate design, e.g.

 Italy 1000 Lire with outdated map borders

 Canadian $5 Olympic Coin. Runner with two left feet

**Part II. Die Varieties**

**Reduction lathe doubling (master hub doubling)**

**Master die doubling (master die with a doubled die variety)**

**Broken hub**

**Broken punch**

**Doubled dies** (incl. tripled dies, etc.)

 Rotated hub doubling (Class I)

 1872 Seated Liberty dime with 175 degree rotation (ES July/August 2003; CW 2/10/03)

 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) (CW 2/14/05, 9/12/05)

 Peripheral doubling (CW 8/2/04)

 Centrally-located doubling

 Weaker impression hubbed last (e.g., 1963-D cent) (CW 6/14/10)

**Weak hubbing**

**Incomplete hubbing**

**Tilted hubbing**

**Repunched date** (CW 12/14/09)

 1956-D cent with repunched 5 (controversial) (CW 9/20/04, 7/16/12)

 1957-D cent with repunched 7 (controversial)

**Re-engraved date (on master die or working die)**

**Blundered date**

**Misplaced date (e.g. digits in denticles)** (CW 4/21/03)

**Misplaced mintmark**

**Phantom mintmark (working hub has mintmark incompletely removed)**

 **(e.g. faint D and S mintmarks in cents from the late 1990s)**

**Dual mintmark**

 1980 D & S cent (recently delisted)

 1956 D & S cent (controversial)

**Inverted mintmark**

**Horizontal mintmark** (inevitably repunched)

**Tilted mintmark (punched-in at an angle)**

**Rotated 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**

**Large over small mintmark**

**Different mintmark styles**

**Overdate**

 Caused by repunching

 Caused by second hubbing with die of different date (Class III doubled die)

**Dual Date (earlier date faint)**

Caused by erasing earlier date on working hub

 Caused by removing earlier date from working die and re-hubbing

 (e.g. 1975 Bahamas 5c with faint date “1973” on opposite face)

**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

**Blundered die (various types)** (CW 8/18/08)

**Die Preparation Errors (Proofs, Mint Sets, Special Mint Sets, Satin Finish, etc.)**

Frosting slop-over (proofs) (CW 2/21/11)

 Offset frosting (proofs) (CW 2/21/11)

 Design removed by proof polishing (CW 2/21/11)

 Field lowered by proof polishing (CW 2/14/11)

 Frosting in wrong place (CW 2/28/11)

 “Frosted Freedom” $50 and $100 platinum coins (CW 8/1/11)

 Frosting omitted

**Design Extension Dimples** (CW 4/18/2011)

**Edge lettering font variants**

Presidential dollars (4 types) (CW 10/18/10)

**Part III. Die Installation Errors**

**Mules (ES, May/June 2010)**

Wrong hammer die

 1995 cent/dime mule

 Wrong anvil die

 1993-D and 1999 cent dime mules

 Wrong hammer and anvil die

 Maryland quarter on Sac planchet in Sac collar (3 specimens)

 Two anvil dies

 Two-tailed clad dime (1 known specimen, probably from 1965)

 Two-tailed clad quarter (2-3 known specimens, probably from 1965)

 1982 Jamaica cent with two obverse faces

 Two hammer dies

 1859 Indian cent with two obverse faces (unique)

 Two different countries

 (1967) Bahamas 5c/New Zealand 2c mule

 Different denominations

 Washington 25c/Sacagawea $1 mules (13 specimens, 3 die pairs)

 Mule die larger than normal die and collar

 1995 cent/dime mule

 Mule die same size or smaller than normal dies and collar

 (All known U.S. mules employ dies of different sizes)

 Temporal mule (mule die representing same denomination and composition but from earlier or later year)

 1959-D wheatback cent (unique)

 Commemorative 1992 Canadian quarter muled with 1993 reverse (CW 9/17/01)

 Temporal/transitional mule (mule die representing same denomination but different year and composition)

 1942-S Cu-Ni five cent coin with small S-mintmark to right of Monticello (unique)

 1993 bimetallic Russia 50 roubles (St. Petersburg mint set only) (ES, March/April 2010)

 Regular-issue die muled with commemorative die

 September and November 1999 Canadian quarters

 Regular-issue die muled with government medal or token die

 2000 Canada “map mule”

 Mules involving pattern dies (various types)

 Normal die paired with pattern or prototype die (CW 2/2/04)

 Coin die matched with private token die (ES, Jan/Feb 2008)

 Collar mule (collar from different denomination of same or similar size installed)

 Lettering die mule (mismatch between edge lettering applied before or after strike and the design shown on the obverse and reverse face)

 Presidential dollar with wrong date on edge

 2009 Zachary Taylor dollar with 2010-D edge inscription (CW 2/22/10, 3/1/10)

 2007-D Sacagawea dollar with Presidential dollar edge lettering (CW 7/9/12)

 Pseudo-mules (3 pathways) (CW 4/28/11, 3/19/12, 4/23/12)

 One U.S. two-tailed quarter may belong in this group (CW 11/27/04)

**Mismatched business / proof dies**

 1999 $5 and $10 gold eagles struck with unfinished proof dies (W-mintmark)

 1998-2000 business strike cents with proof-style reverse (“wide AM”)

 1998-S and 1999-S proof cents with business-style reverse (“close AM”)

 1956 -1964 quarters with “Type B” proof reverse

**Finished proof die matched with business die** (foreign only)

**Minor temporal mismatch (transitional reverse or “mini mule”) e.g.:**

 1939 nickel with reverse of 1938

 1940 nickel with reverse of 1939

 Proof 1940 nickel with reverse of 1938 (CW 4/19/08)

 1964-D quarter with the “Type C” reverse of 1965

 1988 cent with reverse of 1989

 1992-D cent with “close AM” reverse

**Inverted die installation** (not an error) (CW 2/15/10)

 Older issues struck with inverted dies (e.g. buffalo nickels and Mercury dimes)

 Recent installation of inverted dies (beginning 1992)

 Saddle strikes produced by inverted dies

**Fixed rotated die errors** (see Part VI)

**Collar installation error**

 Smooth edge instead of reeded edge (and vice versa)

 e.g. 1863 Indian cent with reeded edge (Coin World, 6/3/2002)

 Smooth edge instead of edge design (and vice versa)

 Reeded edge instead of edge design (and vice versa)

 Segmented proof collar with segments out-of-order (CW 4/7/08)

 2007-S proof Presidential dollar with segments arranged in incorrect sequence (CW 4/7/08)

**Part IV. Die Errors**

**Reeding vs. no reeding varieties** (foreign only)

**Concentric lathe marks** (ES, Nov/Dec 2003) e.g., some 1996 cents

**Rusted die** (CW 12/1/08)

**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 error**

 Excessively wide collar (ES, Nov/Dec 2002)

 Created by improper machining or improperly machined broach

 Created by use of wrong broach

 Improper use of correct broach

 Widening due to wear

 Widening due to 3 or more vertical collar cracks and associated expansion (CW 5/17/10)

 Abnormal reeding, e.g:

 1921 Morgan dollar with infrequent reeding

 1924-D Mercury dime with infrequent reeding

 Low, narrow reeds caused by truncation of ridges on collar face

 (e.g. 1964-D 25c; 2008-P New Mexico 25c) (ES March/April 2010; CW 1/25/10, 4/16/12)

**Channeling** (Hub retouching affecting master and working hubs from 1920s to 1940s) (CW 7/23/12)

**Die retouching**

 Re-engraved “AW” mintmark on 1944-D half dollar (CW 2/2/04, 2/16/04, 3/1/04)

 Re-engraved front of Lincoln's coat (1953 proof cent)

 1938 proof nickels with re-engraved letters and design details (ES Jan/Feb 2009)

**Die damage** (ES, Nov/Dec 2004, Jan/Feb 2003; CW 5/21/12)

 Die dents (ES, Nov/Dec 2004, July/August 2005, Nov/Dec 2005; CW 9/15/03)

 Die scrapes (CW 4/23/07)

 Accidental die scratches

 Die gouge

 Impact scar

 Accidental die abrasion

 Intentional die abrasion ("die polishing") (CW 3/29/10, 5/31/10)

 Heavy die scratches

 Thinning and loss of design elements

 Abrasion affecting entire die face

 Localized abrasion

 Over-polished proof and SMS dies (CW 2/21/2011)

 Localized removal of field from proof polishing (CW 2/14/2011)

 Peripheral die damage (ES March/April 2005)

 Die attrition errors (ES May/June 2003, March/April 2005, March/April 2009; CW 1/4/10)

 Catastrophic die damage (ES March/April 2002; CW 9/15/03, 9/19/11)

 Cancelled die (foreign only)

 1994 Hong Kong bimetallic 10 dollars

**Hubbing-induced die deformation**

 Wavy steps (Lincoln cents only) (ES, July/Aug 2006, Nov/Dec 2006)

 Trails (ES, Sept/Oct 2006, Nov/Dec 2006, Jan/Feb 2011; CW 3/8/10)

**Collar damage**

**Clashed dies** (ES, March/April 2002; CW 3/22/10, 5/30/12)

 Chatter clash (multiple staggered clash marks) (CW 6/25/12)

 Multiple clash marks

 Double clash with reciprocal counterclash (Type 1) (ES, Nov/Dec 2004) (CW 12/13/10)

 Misaligned die clashes (ES, May/June 2004, July/August 2004)

 Horizontally misaligned die clash

 Vertically misaligned (tilted) die clash (CW 1/3/11, 5/9/11)

 Pivoted die clash

 Radically misaligned, rotated, pivoted clashes – produced at installation? (CW 7/12/10)

 Rotated die clash

 Combination clashes

 Mule clash errors, e.g. (ES, July/August 2002) (CW 11/17/08)

 1864 2c reverse die clashed with Indian cent obverse die

 1857 1c obverse die clashed with Seated Liberty 50c obverse die

 1857 1c obverse die clashed with Seated Liberty 25c reverse die

 1857 1c obverse die clashed with Liberty $20 obverse die

 1870 Shield nickel obverse clashed with Indian Head cent obverse

 Floating die clash (collision with die fragments)

 (ES, May/June 2002, May/June 2005)

**Collar clash** (CW 6/11/07)

 Hammer die

 Anvil die (uncommon)

**Die damage with design transfer**

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

 Category B: Counterclash (Type 2) (ES, May/June 2002, July/August 2002, Sept/Oct 2002, Jan/Feb 2009, Sept/Oct 2010) (CW 9/29/08, 12/13/10, 4/9/12)

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

**Die deterioration/deformation errors**

 Severe die wear

 Radial flow lines

 Concentric flow lines (uncommon)

 “Orange peel” effect

 Die deterioration doubling

 Raised

 Incuse (uncommon) (CW 2/4/08)

 "Blebs" or “patches” of die erosion (ES, July/Aug 1998; CW 7/21/03)

 Progressive, indirect design transfer (“internal metal displacement phenomenon”, “ghosting”) (CW 6/7/10)

 Common in 1946-S and 1948-S cents

 Soft die error (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 (CW 2/14/05, 2/28/05)

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

 Die subsidence (sunken die error) (ES, July/August 2004, Nov/Dec 2004; CW 6/2/03, 11/29/04 3/12/12)

 e.g., 1924-S “goiter cent”

 Co-occurring with split die

 Co-occurring with bilateral, radial, antipodal die cracks (CW, 6/20/11)

 1988-P nickels with lump on head (CW 4/4/11)

 Massive die collapse in 2003-D dime (ES, Nov/Dec 2011; CW 8/29/11)

 Design creep

 In late die state 1979 dimes and 1982 quarters

 Peripheral die expansion and erosion (CW 8/13/12)

 “Starburst” pattern of radial streaks on Sacagawea dollars (cause uncertain) (CW 8/15/05, 11/7/05)

 Reciprocally deformed, convexo-concavo dies (2001-P 50c) (ES Sept/Oct 2008)

**Die breaks**

 Cuds

 Ovoid cuds

 Irregular cuds

 Crescentic cud (ES, March/April 2005)

 Circumferential cuds (ES, March/April 2005)

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

 On off-center or broadstruck coins (CW 9/12/11)

 Retained Cud (ES, Jan/Feb 2006) (CW 4/17/06, 7/24/06, 1/24/11)

 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 break (ES, May/June 2003) (CW 10/25/10)

 Connected to die cracks or splits

 Freestanding (ES, May/June 2005)

 Retained interior die break (ES, July/August 2004)

 Connected to die crack or split die

 Freestanding

 Rim cud

 Die chip

 Catastrophic die failure (ES, May/June 2007)

 Spontaneous break

 Break produced by impact

**Collar breaks** (collar cuds) (ES May/June 2008) (CW 11/22/10, 5/17/10)

 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

 Arcing rim-to-rim (“pre-cud”) (ES, Jan/Feb 2006)

 With lateral spread

 Blind-ended

 Bi-level die crack (ES, July/August 2004)

 Bilateral, radial, antipodal die cracks (with centralized subsidence) (ES, Sept/Oct 2011; CW 6/20/2011)

 Die crazing (crazed die)

 Shattered die (ES, Jan/Feb 2006, May/June 2007; CW 4/7/08)

 Two or more splits in die

 Numerous wide, intersecting, raised die cracks

 Numerous intersecting bi-level die cracks

 Various combinations of brittle fracture

**Split die** (ES, Jan/Feb 2006; CW 6/2/03, 4/10/06, 4/17/06, 6/20/2011)

 Median (bisecting) split die

 Asymmetrical split die

 “False split” (bilateral, radial, antipodal die cracks) (ES, Sept/Oct 2011; CW, 6/20/2011)

**Part V. Planchet Errors**

**Alloy errors**

 Improper alloy mix (CW 12/27/11)

 Poorly mixed alloy

 Incorrect proportions of metals

 Gas bubble

 Intact (“occluded”)

 Popped

 Slag inclusion (ES, May/June 2006)

 Intrinsic metallic inclusion (ES, Sept/Oct 2006) (CW 12/27/11)

 Lamination error

 Loss before strike

 Loss after strike

 Lamination crack

 Retained lamination

 Folded-over before strike

 Lamination within clad layer

 Split planchet

 Before strike

 After strike

 Struck with another planchet on top or beneath

 Split core (clad coins)

 Clamshell split

 Clamshell folded over before strike

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

 Split-after-strike (N.B. these are probably all detached cap bottoms)

 Cracked planchet

 Broken planchet / coin (CW 3/14/11)

 Before strike

 After strike

 Brittle coin (cross-classified with annealing errors)

 Radial planchet splits (when struck out-of-collar)

 Crumbling planchet

 Ragged clip

 Ragged notch

 Ragged perforation (“blowhole”)

 Fissures -- ragged and smooth

 Other alloy errors

**Corroded planchet (before strike)**

Copper-plated zinc cents

**Rolling Mill Errors**

 Rolled-thick planchet

 Rolled-thin planchet

 Tapered planchet (CW 12/20/10)

 Rolling indentation (ES, Jan/Feb 2000) (CW 2/7/11)

 Rolled-in scrap (ES, May/June 2006) (CW 2/7/11)

 Bristles from descaling brush (CW 3/10/03)

**Blanking and Cutting Errors**

 Curved clip

 Crescent curved clip

 Bowtie clip (ES, Nov/Dec 2005)

 Two large clips at opposite poles – ends rounded

 Four clips – blanking die slices through previously punched strip

 Struck chopped webbing

 Straight clip

 Smooth straight clip

 Irregular straight clip

 Sawtooth clip

 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 clip (also listed under alloy errors)

 Incomplete punch (incomplete clip) (ES, May/June 2005)

 Elliptical clip (ES, May/June 2005; CW, 7/11/11))

 Multiple clips and combination clips

 Blanking burr (“rolling fold”) (ES, Jan/Feb 2007) (CW 1/31/11)

 Punched-in scrap (ES, May/June 2006)

**Upset Mill Errors**

 Coin struck on blank (“Type I planchet”)

 Abnormally weak upset (ES, July/August 2005)

 Abnormally strong upset (best seen on off-center strikes)

 “Groovy edge” (possibly from worn groove in upset mill)

 Variation in cross-sectional shape of rim/edge junction of planchet

 Struck coin sent back through upset mill

 Abnormal upset (ES, Sept/Oct 2005; CW 2/27/12)

 Wide, flat edge

 Smoothly convex edge

 Abnormally wide proto-rim

 Squeezed-in debris (ES, May/June 2006)

 Foil-like metal wraps around edge onto one or both faces

 e.g. Copper foil on nickels (not from improper annealing)

 Metal wire wraps around edge onto one or both faces

 Pellet embedded in edge

**Edge design errors** (impressed into planchet before strike)

 (includes security edge errors)

 Edge design missing

 Edge design present on normally plain edge

 Wrong edge design

 Edge design too high or too low

 Interrupted edge design

 Tilted edge design

**Mispunched center hole (foreign only)**

 Off-center

 Double punched center hole

 Irregular center hole

 Unpunched center hole

**Annealing Errors**

 Improper annealing (due to excessive heat, prolonged exposure to intense heat, or excessive oxygen in annealing oven) (replaces “sintered plating” and “copper wash”) (ES July/Aug 2010; CW 11/30/09, 2/8/10)

 Black, brown, red, coppery discoloration (includes “black beauty” nickels)

 Layer of copper, often peeling

 Poorly annealed or non-annealed planchets (hard, brittle planchet)

 Broken planchet

 Broken coin

 Radial cracks in coin (usually struck out-of-collar)

 Brittle coin (cross-classified with alloy errors) (CW 3/14/11)

 Abnormally hard planchet

 1954-S nickels

 1983-P nickels (CW 4/11/11)

 “Superclash” 2000-P nickel (CW 3/22/10)

 On undersized or underweight planchets (CW 2/13/12)

**Miscellaneous forms of discoloration**

**Plating Errors**

 Incomplete plating

 Unplated cent

 Thin plating

 Thick plating (ES, March/April 2009)

 Blistered plating

 Circular blisters

 Linear blisters

 Ruptured blisters

 Brassy plating

 Cracked, split, and peeling plating

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

Missing clad layer

 Full

 Before strike

 After strike

 Before rolling is completed (full weight) (ES, Sept/Oct 2002, Nov/Dec 2006; CW 5/28/12)

 Partial

 Before strike

 After strike

 Before rolling is completed

 Thin cladding

 With gaps

 Missing both clad layers

 Core thickness (ES, Sept/Oct 2003)

 Full thickness

 Struck clad layer

 Split off after strike

 Split off before strike

 Struck by itself

 Struck on top of or beneath a normal planchet

 Clamshell separation

 Clad layer folded over before strike

 Missing core

 Partial

 Full (Coreless or all-clad coins, 10c and above) (CW 12/19/11)

**Irregular planchets**

 Scraps / fragments (CW 12/21/09)

 Normal alloy/composition

 Off-metal

 Feeder finger material

 Foil

 Heavier than normal coin of same denomination

 Wider than normal coin of same denomination (along at least one axis)

 Ragged clip (cross-classified with alloy errors)

 Ragged notch (cross-classified with alloy errors)

 “Blowhole” (cross-classified with alloy errors)

 Fissure (cross-classified with alloy errors)

 Cracked planchets (cross-classified with alloy errors)

**Pre-Strike Damage** (CW 11/15/10, 11/15/10, 1/23/12, 1/30/12)

 Assay clip (cross-classified with blanking errors)

 Rim burr

 Accidentally and intentionally “resized” planchets

 “Cutmarks” (mostly found on off-metal errors 5c/1c, 5c/10c)

 Rockwell test mark in planchet (circular dimple) (ES, July/Aug 2006)

 Planchet with adjustment marks (gold or silver planchets filed to reduce weight)

 Edge rolled, squeezed, and folded-over (or with thin apron produced)

 (CW 11/15/10; 1/23/12)

 Pre-plating damage (zinc cents) (CW 1/23/12)

 Post-plating damage (zinc cents) (CW 11/15/10)

 Other forms of pre-strike damage

 Gouged

 Crushed

 Scraped

 Torn

 Crumpled (CW 8/15/11)

**Inter-Strike Damage** (CW 1/9/12)

**Damage coincident with strike** (CW 5/30/2011)

 Flat contact facet opposite off-center strike

 Dual contact facets in multi-struck coins

**Wrong planchet and off-metal errors**

 Wrong planchet, correct composition

 Off-metal

 Domestic

 Foreign

 Unidentified origin and purpose (orphan) (ES, Sept/Oct 2006, Nov/Dec 2006, March/April 2011, May/June 2011; CW 5/10/10, 12/19/11)

 Pure copper quarters and dimes (covered under bonding mill errors)

 Pure clad dime (covered under bonding mill errors)

 Wrong stock error (CW 2/20/12)

 Correct composition

 Off-metal (e.g, 1987-P nickel struck on clad quarter stock)

 Business strike on special off-metal planchet

 (e.g., 1974-D and 1977-D silver-clad Eisenhower dollar)

 Special strike on business planchet

 (e.g. 1973-S Eisenhower dollar on Cu-Ni clad planchet)

 Business strike on proof planchet

 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 overstrike (not an error)

 Transitional error (“wrong series”) (ES, Sept/Oct 2001)

 Transitional/wrong denomination error

 (e.g. 1965 quarter struck on silver dime planchet)

 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 cent design on struck SBA dollar (several known)

 1981 dime on cent cap

 Canadian “assisted errors” 1977 - 1981

 Struck on loose clad layer (covered under bonding mill errors)

 Weld seam planchets (controversial)

 Coin struck on washers, gears, and other hardware

 Coin struck on “aluminum” feeder finger

 Experimental issues

 Experimental wartime planchets (CW 12/7/09, 12/21/09)

 1999 and 2000 state quarters on experimental alloys (CW 11/26/01)

 1999 Susan B. Anthony dollars on experimental alloys (CW 8/5/02)

 1974 aluminum and bronze-clad steel cents (CW 1/13/03)

**Part VI. Striking Errors**

**Unstruck blank (“Type I”)**

**Unstruck planchet (“Type II”)**

**Die alignment errors**

Rotated die error(CW 6/21/10)

 Rotated die due to improper installation (fixed rotation)

 Rotated die due to improper die preparation (fixed rotation)

 (e.g., grinding flats in wrong spot)

 Rotated die due to movement after installation (dynamic rotation)

 Semi-stable rotated die errors (various causes)

 Characterized by a limited range of motion, a limited number of positions, or the presence of a single dominant position (CW 7/9/12)

 Pivoted die error (probably involves entire die assembly)

 Horizontal misalignment (CW 10/27/03)

 Hammer die (CW 2/1/10)

 Anvil die (ES, Sept/Oct 2004, March/April 2005) (CW 9/27/10)

 With misaligned collar

 With broken collar

 Dynamic misalignment (CW 6/25/12)

 Stable misalignment

 Vertical misalignment (ES, Jan/Feb 2003, Sept/Oct 2003) (CW 12/8/03, 12/20/10)

 Hammer die (CW 2/1/10)

 Anvil die

 Dynamic misalignment

 Stable misalignment

 Dual misalignments (both dies misaligned in different directions)

 Compound misalignments

 Horizontal and vertical

 Horizontal and rotated

 Rotated and vertical

**Collar Alignment Errors**

 Misaligned collar

 Associated with misaligned anvil die

 Associated with stiff collar error

 Associated with elliptical strike clip

 Rotated collar (detectable only when there’s a collar break and a multi-coin progression)

**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 (controversial)

 Broadstrikes

 Centered

 Uncentered

 Cupped broadstrike

 Forced broadstrike (CW 1/10/11)

 Partial collar broadstrike (shows incomplete, tilted partial collar)

 Stiff collar errors (ES, Nov/Dec 2000; CW 8/25/08)

 Strong collar scar

 Strong collar scar with cupping

 Planchet forced completely into fully deployed collar (“ram strike”) (ES, Nov/Dec 2000, March/April 2001)

 Elliptical strike clip (ES, March/Apr 2000)

**Weak Strikes** (ES, Sept/Oct 2000; 3/1/10; CW 5/3/04, 9/11/06, 6/18/07, 5/23/11)

 Caused by insufficient die approximation

 Caused by abnormally low ram pressure

 Invisible strike (ES March/April 2003, Nov/Dec 2003, March/April 2004, Nov/Dec 2006, May/June 2010) (CW 5/3/10, 9/20/10)

 With indent

 With partial brockage

 With struck-through error

 Followed/preceded by strong strike

 Weak saddle strike

 One strike weak, one strong

 Both strikes weak (CW 12/12/11)

 In combination with other striking errors

**Abnormally strong strike**

 Due to abnormally high pressure setting

 Finning (CW 8/23/04)

 Extremely large broadstrike

 Extreme stretch strikes with both sides die-struck

 Due to stacked coins or planchets

 Localized, due to die tilt

**Stutter Strikes** (ES, Nov/Dec 2001, Sept/Oct 2007; CW 12/28/09, 7/25/11)

 Due to spasmodically collapsing or stiff collar (Type I)

 Due to planchet flexion (associated with indents and brockages) (Type II)

 Due to contact with bent planchet or coin (Type III)

**Concentric strike lines generated by a single strike** (ES Jan/Feb 2012; CW 12/28/11)

**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; CW 3/15/10)

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

 “Slide doubling” (smeared design)

 Intermediate forms

 Multiple machine doubling in one direction (two, three, and four serried ranks)

 Machine doubling in more than one direction (up to three directions)

 Machine doubling on both faces of same coin

 One-sided, rim-restricted design duplication (see separate category)

 Affecting incuse design elements (CW 2/6/06, 1/16/12)

**One-sided, rim-restricted design duplication** (form of machine doubling) (CW 10/6/03)

 2004 cent (ES, March/April 2007)

 1994 cents (CW, 5/24/2010, 8/22/2011)

 Presidential dollars (ES, Sept/Oct 2007) (CW 2/22/10, 12/6/10)

 Foreign coins

**Design ablation error (design scraped off by die movement)** (ES,March/April 2008; Jan/Feb 2011) (CW 9/13/10)

On first strike

 On second strike

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

 Hammer die rotated (CW 11/29/10)

 Instantaneous

 Gradual

 Hammer die misaligned

 Instantaneous

 Gradual

 Anvil die rotated (at least one known example, a proof Kennedy half dollar)

 False one-sided double strikes (CW 11/29/10)

**Off-center strike**

 Cupped off-center strike

 With collar scar

 Without collar scar

 Uniface strike

 Stretch strike

 Uniface

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

 With unexplained, flat dent at opposite pole

 (not “sideneck strike”)

**Chain strike**

 Normal chain strikes with straight edge

 External chain strikes(ES, Jan/Feb 2003)

 Concave, convex, sinuous, and irregular chain strikes (ES, Jan/Feb 2001, July/August 2002; CW 4/12/10)

**Wraparound strike** (theoretical, so far)

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

**Saddle Strike** (CW, 6/27/11)

 Hump present

 Hump absent

 Die position

 Head-to-head

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

 Other orientations

 Gap between adjacent dies

 Narrow

 Wide

 Sideneck strikes (“one-die saddles”) (Expanding planchet collides with side of die neck)

 With inverted die installation

**Broadstrike** (covered under collar deployment errors)

**Foldover Strike** (ES, July/August 2007) (CW 10/10/05)

 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 Strike** (CW, 7/18/11)

 Flat

 Bent

 With off-center strike or broadstrike produced by continuation of downstroke

**Extrusion strike** (an effect, not an independent error) (ES, March/April 2004; CW 10/24/11)

 With indent or partial brockage

 With struck-through error

 Other

**Multiple strikes**

 On-center/Off-center

 In-collar/out-of-collar

 Flipover

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

 Involving more than one die pair

 Delayed second strike (ES, July/August 2007; CW 1/9/12)

**Indent**

 In-collar/out-of-collar

 Partial

 Full (CW 7/30/12)

 Centered

 Uncentered

 “Internal” indents (CW 11/1/10)

 On obverse

 On reverse

 Multiple indents

 Irregular indent

 Produced by error coins

 Produced by clipped planchet

 Indent by smaller planchet (CW 5/19/08)

**Brockage**

 Full

               Centered

               Uncentered

 Rotated brockage (relative to die-struck design on opposite face)

 Partial

 Conventional

 Aligned partial brockage (ES, May/June 2005; CW 1/17/11)

                    From partial die cap

                    From elliptical clip coin

                    From elliptical strike clip

 Internal partial brockage (CW 11/1/10)

 In-collar/out-of-collar

 From another, smaller denomination (ES, May/June 2005)

 From another error coin

 Flipover brockage

 On obverse

 On reverse

 First-strike brockage

 “Mirror” brockage (unexpanded, undistorted)

 Distorted first-strike brockages

 Mid-stage and late-stage brockages

 By struck fragment (CW 6/11/12)

 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-stage die cap

 From multi-struck coin

 Clashed cap strike (CW 8/30/10, 11/21/11))

 From a late-stage die cap that clashed with the opposite die

 From a uniface die cap that clashed with the opposite die

 From an early-stage die cap that clashed with the opposite die

 From a cap that was striking counterbrockages that clashed with the opposite die

**Counterbrockage**

 Full (CW 10/11/10)

 Partial (CW 11/8/10)

 In-collar/Out-of-collar

 Counterbrockage of obverse on obverse

 Counterbrockage of reverse on reverse

 Flipover counterbrockage

 Early, middle, and late-stage counterbrockages

 From another error coin

 Brockage-counterbrockage combination (8 types) (ES, Nov/Dec 2009)

 Multiple counterbrockages (ES, March/April 2010)

 On second strike

**Die caps**

 Obverse die cap (obverse die functioning as hammer die)

 Raised reverse design

 Brockage on reverse face

 Uniface die cap

 Complex die caps

 Reverse die cap (reverse die functioning as anvil die)

 Centered

 Uncentered

 Cupped toward anvil die, hammer die, both dies at opposite poles, or expanded in the horizontal plane

 Partial (off-center) die cap (hammer or anvil) (CW 1/17/11)

 With cupping

 Without cupping

 Detached cap bottom (ES, March/April 2001, May/June 2001)

**Capped die strike** (generic -- without identifiable images)

 Struck by uniface die cap

 Struckthrough late-stage die cap

 Struck through cap-like obstruction

 Struck through split or torn cap

**Capped die doubling** (doubling associated with capped die strikes) (ES, Sept/Oct 2005; CW 6/18/12)

 Shifted/rotated cap strikes (ES, May/June 2000, March/April 2012)

 Normally-oriented incuse design elements (CW 11/3/08, 6/28/10, 6/11/12)

 Multiple sets due to several preceding shift-and strike events

 Unexplained, close raised doubling

 Expansion ripples

 Other forms of close raised doubling

 Incuse doubling surrounding raised elements

**“Struck-through” errors**

 Struck through fragment

 Struck through clipped planchet (ES,Sept/Oct2002)

 Struck through thin struck fragment (CW 6/11/12)

 Face-up (normally-oriented incuse design elements)

 Face-down (mirror-image design elements)

 Trapped between planchet and opposite die (mirror-image design elements)

 Struck through detached lamination flake (CW 2/7/05, 6/11/12)

 Struck through clad layer

 Clad layer unstruck

 Clad layer previously struck

 Struck through loose (sheared-off) reeding

 Struck through split planchet

 Obverse

 Reverse

 Struck through feeder finger (ES, Nov/Dec 2005)

 1986 Silver Eagles struck through emery disc (CW 12/16/02)

 Struck through die fill

 “Grease strike” (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, Nov/Dec 2008)

 Struck through miscellaneous foreign matter

 Metal dust, shavings

 Thread

 Cloth (CW 5/14/12)

 Wire

 Split or torn in two by struck-thru object (ES, Nov/Dec 2007) (CW 3/7/11)

 Dropped filling (ES, May/June 2003) (CW 8/16/10, 6/11/12)

 Isolated elements (“dropped letter”, “dropped number”) (CW 2/7/05)

 Conjoined dropped fillings (CW 8/16/10)

 Large dropped filling incorporating numerous design elements (CW 4/19/10, 8/16/10)

 Retained dropped filling

 Retained struck-through errors (struck-in errors)

 Embedded dropped filling (see above)

 Scrap metal

 “Staple” (bristles from wire brush)

 Plastic (associated with bullion coins)

 Metal foil

 (Cu-Ni?; associated with dimes and nickels)

 Copper foil (ES, Nov/Dec 2007)

 Rubbery material (from die cover?)

 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 strike** (cross-classified with Indents) (CW 7/30/12)

 In-collar

 Out-of-collar

 Centered

 Off-center

**Sandwich strike** (coin struck between two coins or planchets) (CW 5/16/11)

 Partial

 Full

 Between two struck coins

 Between two planchets

 Between a coin and a planchet

 Between obverse and reverse die cap

**Nested coins**

**Mated pairs**

**Bonded coins**

**Pile-ups**

**Ram strike** (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 (several kinds) (CW 4/5/10)

 Saddle strike/strike clips

 “Pinch clips”

 Other

**Detached reeding**

 From forced broadstrikes

 From stiff collar

 Torn-off fin

 Other

**Coin shrapnel** (“breakaway fragments”)

 Angular pieces

 Crescentic pieces

 Roughly circular pieces

 Semilunar pieces

 Other shapes

**Cupping** (CW 12/7/09)

 With and without collar scar

 In a single strike

 Associated with multiple strikes

 With die caps

 Cupping toward hammer die

 Cupping toward anvil die

 Expansion in horizontal plane

**Bi-metallic errors** (foreign only) (ES, Nov/Dec 2005)

 Misaligned core (ES, May/June 2007)

 Misaligned center hole (ES, Sept/Oct 2007)

 Well-seated core

 With misaligned core

 Double-punched center hole

 Unpunched center 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 ring (ES, Jan/Feb 2007)

 Struck core (ES, Nov/Dec 2006)

 From another denomination

 From another country (ES, Nov/Dec 2011)

 Struck by solid-denomination dies

 Wrong core inserted

 Wrong ring (ES, March/April 2007)

 Ring accidentally punched from solid planchet

 Ring accidentally punched from solid coin (ES, Nov/Dec 2008)

 Struck ring from another country (restruck)

 Struck core from another country (restruck)

 Unstruck core inserted into struck ring and then restruck

 Abnormally small core (controversial)

 Abnormally wide center hole (controversial)

 Abnormally thin core

 Abnormally thick core

 Abnormally thin ring

 Abnormally thick ring

 Incomplete trilaminar core

 Missing one layer

 Missing two layers

 Core punched out of ring strip

 Ring punched out of core strip

 Bi-metallic planchet struck by solid-denomination dies

 Solid-denomination planchet struck by bi-metallic dies

 Bi-metallic planchet struck with wrong bi-metallic design

**Multi-sided coins** (foreign only)

 Malrotation

 Broadstruck

 Forced into collar

**Proof edge lettering errors** (generated during strike by segmental collar)

 Weak edge design due to segmented collar not closing fully (wide seams)

 Segments arranged in incorrect sequence (see Die Installation Errors) (CW 4/7/08)

**Part VII. Post-Strike Mint Modifications**

**Edge lettering applied after strike** (incuse) (Business strike Presidential dollars)

 Absent lettering (CW 4/26/10)

 Due to bypassing the lettering device

 Due to excessive spacing between steel wheel and lettering die

 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

 Letters impressed too deeply and coin squeezed too hard

 Incomplete letters

 Smeared letters

 Edge letter font subtypes (CW 10/18/10)

 Wrong date on edge (doesn’t match any President of that year) (CW 2/22/10, 3/1/10)

 2007-D Sacagawea dollar with Presidential edge lettering (CW 7/9/12)

 Edge lettering on unstruck planchet (CW 3/26/07, 3/17/08)

**Note: Edge lettering and other edge design elements may be impressed during upsetting, during the strike, by a special machine before the strike, or by a lettering device after the strike. Similar-looking defects can occur in each of these processes. Any edge design that forms a closed interlock between the edge of the coin and the collar cannot be produced during the strike since that will prevent ejection of the coin after the strike.**

**Post-strike chemical treatment**

 Anti-tarnishing Experimental Rinse on Sacagawea dollars

**Matte or frosted finish applied after strike**

 Finish omitted on one or both dies (CW 8/1/11, 8/29/11)

**Part VIII. Post-strike die contact**

**Ejection impact doubling** (post-strike design transfer from die) (ES, Jan/Feb 2005; CW 8/1/05, 8/29/05)

**Part IX. Post-strike mint damage**

**Pseudobrockage** (false brockage) (ES, Nov/Dec 1999) (CW 8/23/10)

**Fused coins**

**Rolled and squeezed**

**Accidentally resized**

**Other (folded, crushed, scraped, bent, etc.)**

**Part X. Wastebasket/Composite**

**Categories**

**Ghost images** (CW, 8/1/11)

 Progressive, indirect design transfer

 Worn clash marks

 Thin planchet

 Split planchet

 Split-before-strike

 Split after-strike

 Coin thinned by strike(s)

 Weak strike (CW 4/11/2011)

 High pressure strike

 “Greasy ghost” (CW 7/5/10)

 Surface film afterimage (CW 5/2/11)

 Surface film transfer (CW 5/2/11)

 Split plating afterimage (CW 5/2/11)

 Coarsened crystallite afterimage (CW 5/2/11)

 Other causes

**Doubling**

 Die Deterioration Doubling

 Raised

 Incuse

 Machine Doubling

 “Abrasion doubling” (rare)

 Split plating doubling (split-line doubling) (CW 3/26/12)

 Surface film doubling

 Doubling associated with grease strike

 Longacre doubling

 Offset laser-etched frosting on proof dies (CW, 2/21/2011)

 Plating disturbance doubling (CW, 3/28/2011)

 Other forms of doubling

**Embedded matter** (CW 12/14/09)

 Poured-in

 Slag

 Intrinsic metallic inclusion

 Rolled-in

 Punched-in (by blanking die)

 Squeezed-in (by upsetting mill) (CW 9/6/10)

 Struck-in****