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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Italy 1000 Lire with outdated map borders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****