

Australian Government

Royal Australian Mint

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Silver Blanks Presentation

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Silver Collector coins

- Numismatic coins of the highest quality.
- Detail: highest attention to the smallest detail
- Cost: beautiful affordable coins for our customers
- Starting point: materials and quality
- Results: best coins, highest quality, awarded globally

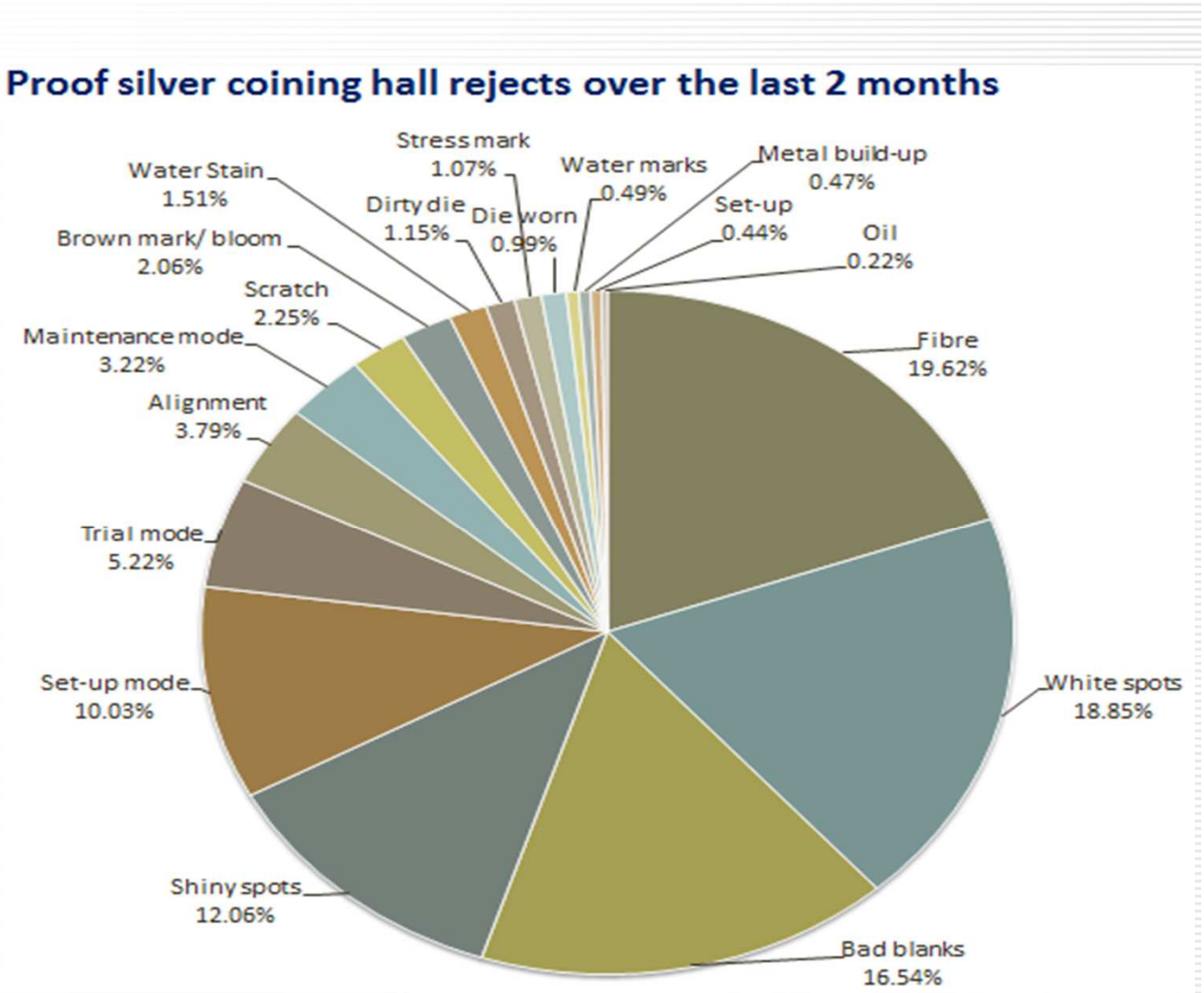


Silver Coin Costs

- The Problem: Costly production rejects
- The Detail: Inwards goods quality levels
- The Cost: Rejects at the Coining press
- The Cause: Silver material and physical quality
- Target: Identify ***systematic*** causes of “failures”



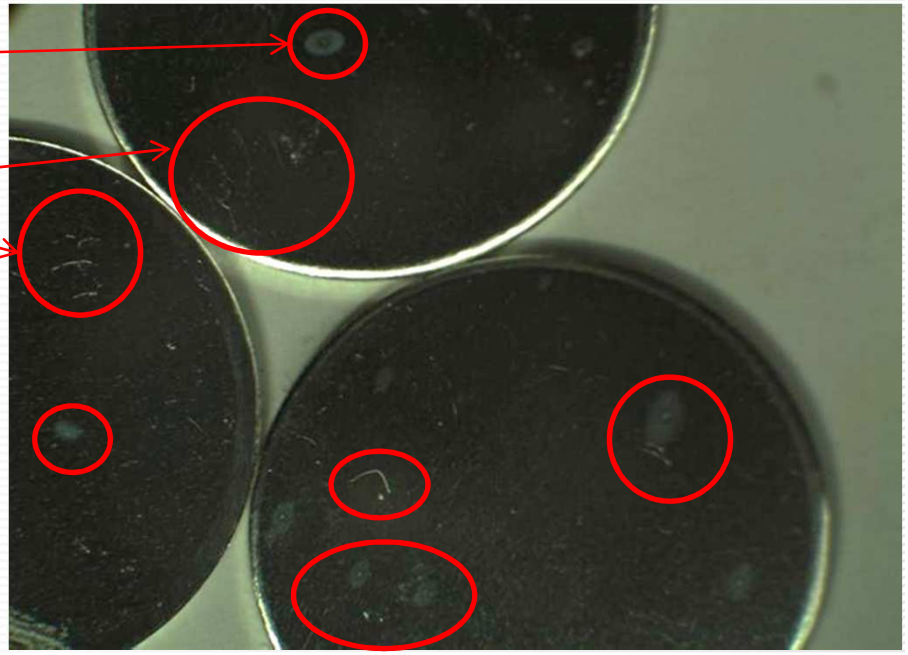
Data collected shows reject causes



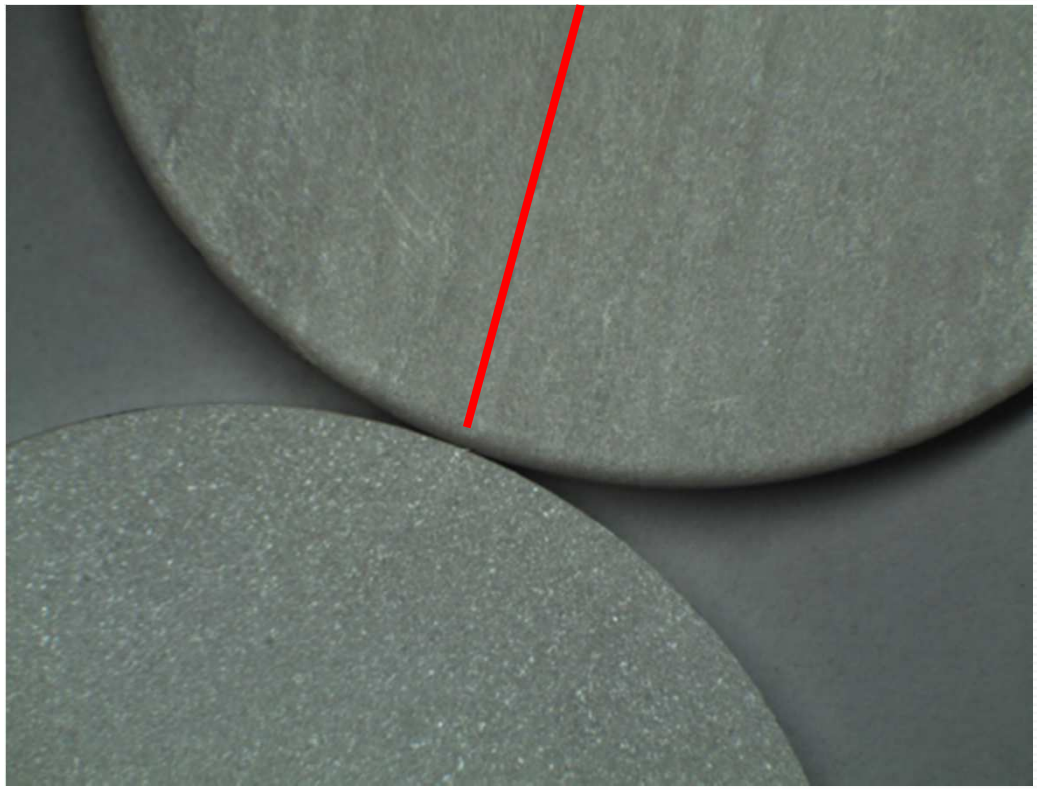
Silver Collector Coins

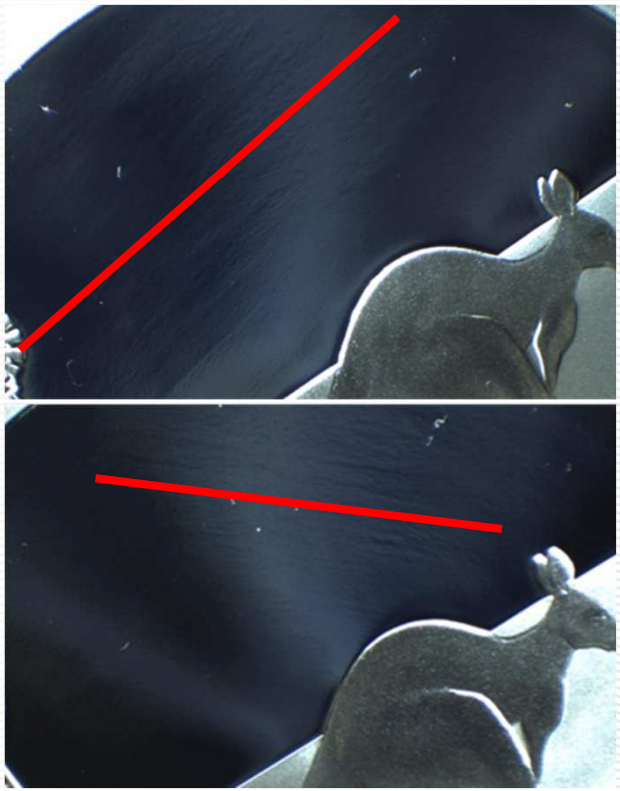
Initial problem assessment

- Spotted blanks
- Scratches & Lines
- Hollows & Dents
- Impurities



Impact of Blank Defects





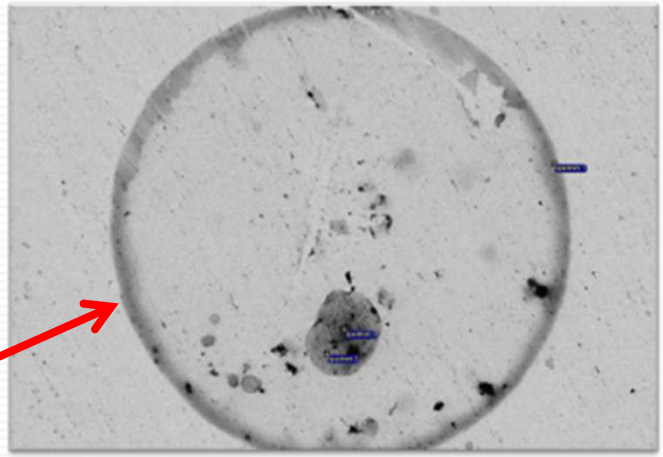
Impact on Product Quality

Spots on the product cause rejects:-

- Oil emitted from equipment
- Residue from washing & drying
- Ejected from compressed air lines

We proceeded to systematically test each step in our blank process to validate our data findings.





White spot (corrosion product) on blank.



White spot (oil & pickled-surface) on coin.

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Completed studies

Blank Processing Equipment and Activities:-

- Acid pickling solution was tested with 5 suppliers blanks in various states of preparation.
- We found that the state of the surface microstructure impacted the post pickled quality. Rough vs Smooth.
- We found that the initial blank hardness and grain size affected the rate of metal loss during pickling.
- We tested our baths to ensure uneven pickling had not caused a pickling rate difference between suppliers.
- We confirmed that a standard specification was needed, that process variability was too great to use standard blanks off the shelf.

Completed studies (cont)

Silver Purity: 999 or 9999

- We worked with suppliers to resolve imperfection and impurity problems to achieve standard specification.
- We found that 999 or 9999 silver showed little difference on the coin as other factors impact.
- We did find that the *type* of impurity affected appearance.
- 999 silver with a ppm of 50 or 250 can coin equally well if the impurity is dissolved in the silver.
- Wrong impurity type means coloured spots appear.
- Surface imperfections cause a higher level of rejects than impurities that are well controlled.

Results of Study

Silver Specification Standard

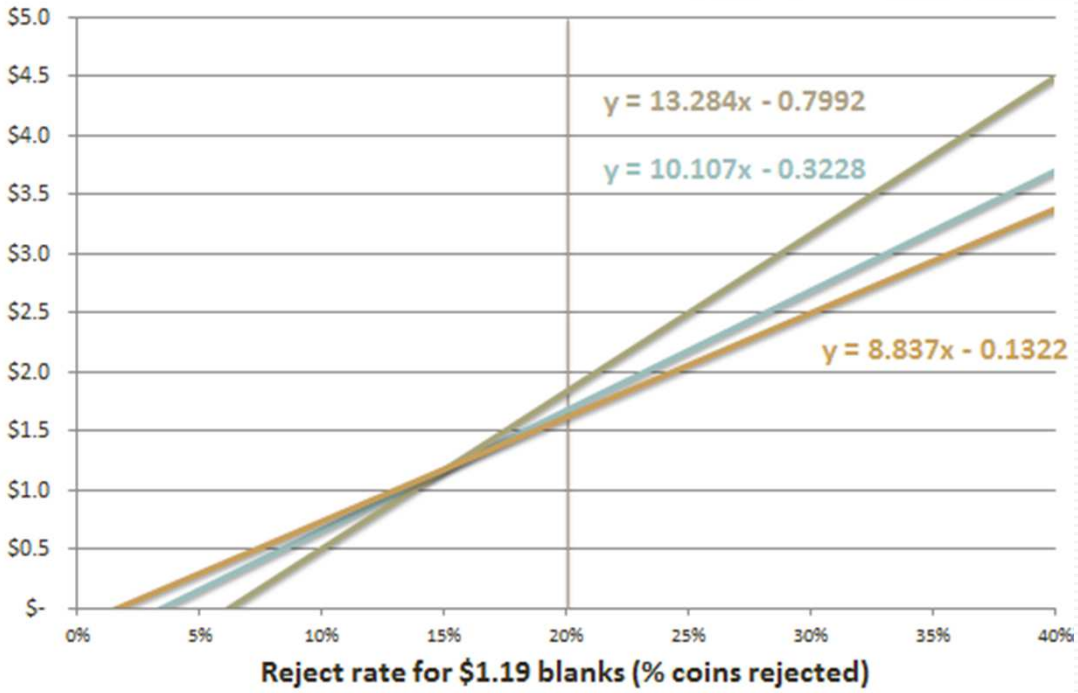
- RAM did hundreds of tests on blanks & coins, using visual, SEM and other techniques.
- Found our unique needs compared to others.
- All Mints have different blank requirements.
- RAM needs a well controlled surface visual finish, roughness & hardness for pickling.

Results of study (cont)

- Small appearance or metallurgical differences from supplier to supplier does cause greatly higher rejection rates for blanks and coins.
- RAM now has a reliable supplier/s who can meet the specification standard.
- RAM now has the information and processes to determine the cause of poorly performing blanks.

Business Impact

- Coining process must begin with highest quality silver blanks
- Maintaining systematic methods ensure best quality coins



15% vs 20% reject rate

Current expectation for $1.19 blanks
Linear (Die life of 200 coins)
Linear (Die life of 350 coins)
Linear (Die life of 500 coins)

Specification and testing

- Inwards goods inspection of purchased silver blanks
- Accept only blanks meeting the highest specification
- Staff experience in testing and inspection is a key
- Coining excellence results from good specification
- RAM works with partners to maintain improvements







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Research & Learnings

- Coin blank material performance requirements
- Life cycle costs of whole process
- Knowledge base and library of >25yrs of learning



Project Outcomes

- Satisfied customers
- High quality products
- Cost effective manufacture
- Sustainable business



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Questions?





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