

WRITTEN TECHNICAL REPORT

Weighting: 70%

Module: ACMA4039 – Engineering Applications & Study Skills

Assessment: Root Cause Analysis – Technical Report

Student: Ieuan Jones

Student ID: 2503192

Engagement with Literature Skills (15 marks)

Mark awarded: 13 / 15

Ieuan demonstrated strong engagement with relevant professional and industrial literature. The report appropriately references the IMechE Code of Conduct, the Health and Safety at Work Act, and company-specific standards used within Aston Martin. These sources are relevant to manufacturing engineering and are well integrated into the discussion of quality, reputation, and risk.

The literature review clearly explains the role of RCA and FMEA within manufacturing environments. However, the range of sources is more weighted towards professional guidance than academic journal literature.

What was done well

- Appropriate use of professional and legal standards.
- Clear linkage between literature and the real manufacturing case study.
- Good explanation of how risk management supports quality and reputation.

What could be improved

- Greater use of peer-reviewed academic journals would strengthen academic depth.
- Some sources could be compared more directly to demonstrate critical engagement.

Suggested enhancement

- Add a short comparison table summarising *RCA*, *FMEA*, *Fishbone*, and *Fault Tree Analysis*, highlighting when each tool is most effective in manufacturing.

Knowledge and Understanding Skills (25 marks)

Mark awarded: 22 / 25

The report shows a very good understanding of manufacturing risk management and RCA methodology. Ieuan clearly explains the etch application process, the importance of flash-off time, and how deviations from supplier technical data sheets led to paint blistering defects.

The discussion demonstrates strong understanding of how process changes, takt time, and operator availability can directly impact product quality and rework costs.

What was done well

- Clear explanation of the manufacturing process and defect mechanism.
- Strong understanding of RCA, FMEA, and RPN concepts.
- Effective linkage between process documentation, supplier data, and defect occurrence.

What could be improved

- Some technical explanations could be slightly expanded to show wider organisational impact.
- A brief comparison with alternative RCA tools would add breadth.

Suggested enhancement

- Include a process flow diagram of the paint and etch application process showing where flash-off time is critical.

Cognitive and Intellectual Skills (20 marks)

Mark awarded: 18 / 20

Ieuan demonstrated strong analytical thinking when justifying the RCA rankings. The use of DPV data before and after the process change shows clear evaluation of risk severity and occurrence. The explanation of how reduced flash-off time increased defect rates is logical and well supported by data.

The reasoning behind immediate containment followed by a permanent solution is appropriate and shows good engineering judgement.

What was done well

- Clear and logical justification of severity, occurrence, and detection ratings.
- Effective use of production data to support analysis.
- Good evaluation of revised processes and remaining risk.

What could be improved

- Residual risk following the revised process could be discussed more explicitly.
- Some numerical comparisons could be summarised more clearly.

Suggested enhancement

- Add a before-and-after bar chart comparing DPV values to clearly visualise improvement.

Practical Application Skills (20 marks)

Mark awarded: 19 / 20

The practical application of RCA is a key strength of this report. The case study is highly relevant, realistic, and clearly rooted in real manufacturing practice. The use of supplier technical data, internal DPV trackers, and validation trials demonstrates excellent practical engineering judgement.

The solution is realistic, cost-aware, and well justified, showing clear improvement without increasing staffing levels.

What was done well

- Excellent real-world industrial case study.
- Clear linkage between root cause, corrective action, and outcome.
- Strong use of production and validation data.

What could be improved

- A brief discussion of long-term robustness or scalability of the solution would strengthen realism.

Suggested enhancement

- Include an annotated image or schematic of the paint process highlighting the etch stage and flash-off timing.

Transferable Skills for Life & Professional Practice (20 marks)

Mark awarded: 18 / 20

The report is well structured, clearly written, and professionally presented. Headings are logical, the flow is clear, and figures are used effectively to support the discussion. The technical language is appropriate for both academic and industrial audiences.

What was done well

- Clear structure aligned with the brief.
- Professional tone and strong technical communication.
- Effective use of figures and data.

What could be improved

- Minor grammatical refinements would further improve fluency.
- Some figures could be referenced more explicitly in the main text.

Suggested enhancement

- Add a final summary flowchart showing *process change* → *defect* → *RCA* → *revised process* → *reduced DPV*.

Written Report Mark Summary (70%)

Criterion	Mark
Engagement with Literature	13 / 15
Knowledge & Understanding	22 / 25
Cognitive & Intellectual Skills	18 / 20
Practical Application Skills	19 / 20
Transferable Skills	18 / 20
Total (Written Report)	90 / 100

Weighted Contribution to Module (70%):
63.0 / 70