Root cause and SMS update

Dr Marie Langer, Airworthiness Surveyor

CAA Rotocraft AW Seminar 1st October 2019

Civil Aviation Authority

CAP 1760

Safety and Airspace Regulation Group

Effective Problem Solving and Root Cause Identification

CAP 1760

Shainin
(Red X)

Six Sigma

8D

Kepner-Tregoe
TQM

BowTie

Fault Tree Analysis

Ishikawa
Fish Bone

5 Whys

3 Concerns

EVENT

Issue 02 April 2019

CAA Notification of Open Audit Findings

Civil Aviation Authority

Dear Sir,

UK CAA NOTIFICATION OF OPEN AUDIT FINDINGS

Further to the audit carried out on {INSERT DATE} by the UK CAA, the findings as listed on the attached audit report are herewith confirmed for your attention and necessary remedial action.

Please supply to us within 15 days of this letter or within the finding due date whichever is sooner, an acknowledgement of the findings; a high level corrective action plan; confirmation that a root cause analysis has been instigated, and proposed timescales to implement the corrective actions.

Further to this, to ensure UK CAA has adequate time for the findings(s) to be closed, please respond in to this office by the agreed 'Response Date', which is a minimum of 21 (or as required) days before the 'Due Date(s)' stipulated on the report.

Should it not prove possible to implement the necessary corrective actions within the dates stipulated, at the earliest opportunity and before the required 'Response Date', please submit in writing to this office a request for an extended agreed timescale which must include a corrective action plan.

For your final detailed response to be acceptable in accordance with the applicable requirement, it should address the following points for each finding:

1. Corrective action.
2. Preventive action - Unless stated below, this should include root cause identification and root cause correction.
3. Follow up action taken or proposed action to be taken with associated timescales.

Guidance on Root Cause Analysis can be found on the CAA website.

Failure to adequately action the findings prior to the defined 'Due Date' may result in the suspension or revocation of your approval. Once your report has been received and the corrective actions accepted, the Audit Report will be updated and returned to you confirming closure of each finding.

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CAA Website

Approval information and guidance

- Maintenance standards improvement intiative
- Guidance for Part 145 approval holders
- Guidance for Part 147 approval holders
- Guidance for Part M Subpart G approval holders
- Guidance for Part 21 Subpart G approval holders
- Finding level and safety severity guidance
- Root cause analysis
- Seminars

https://www.caa.co.uk/Commercial-industry/Aircraft/Airworthiness/Approval-infomation-and-guidance/Root-cause-analysis/

Are We Learning?

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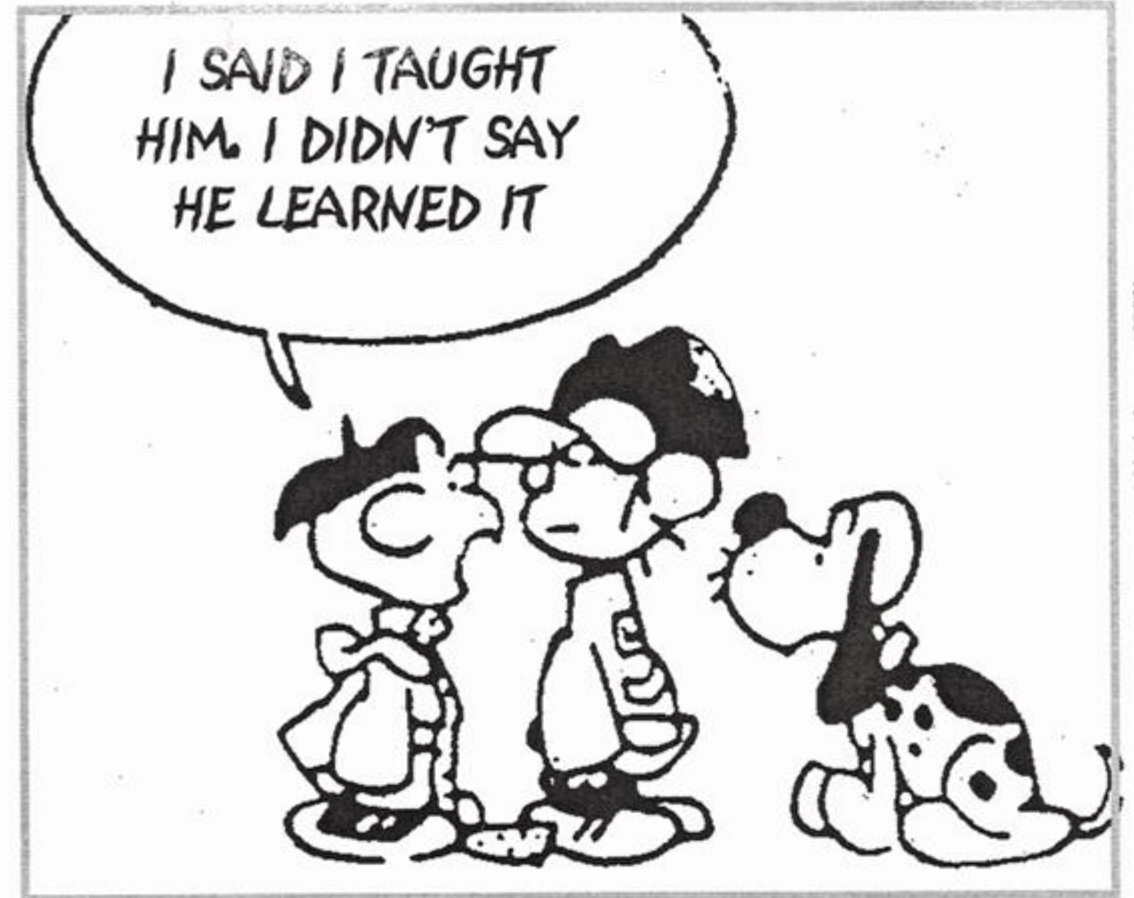
Many organisations monitor repeat findings/events

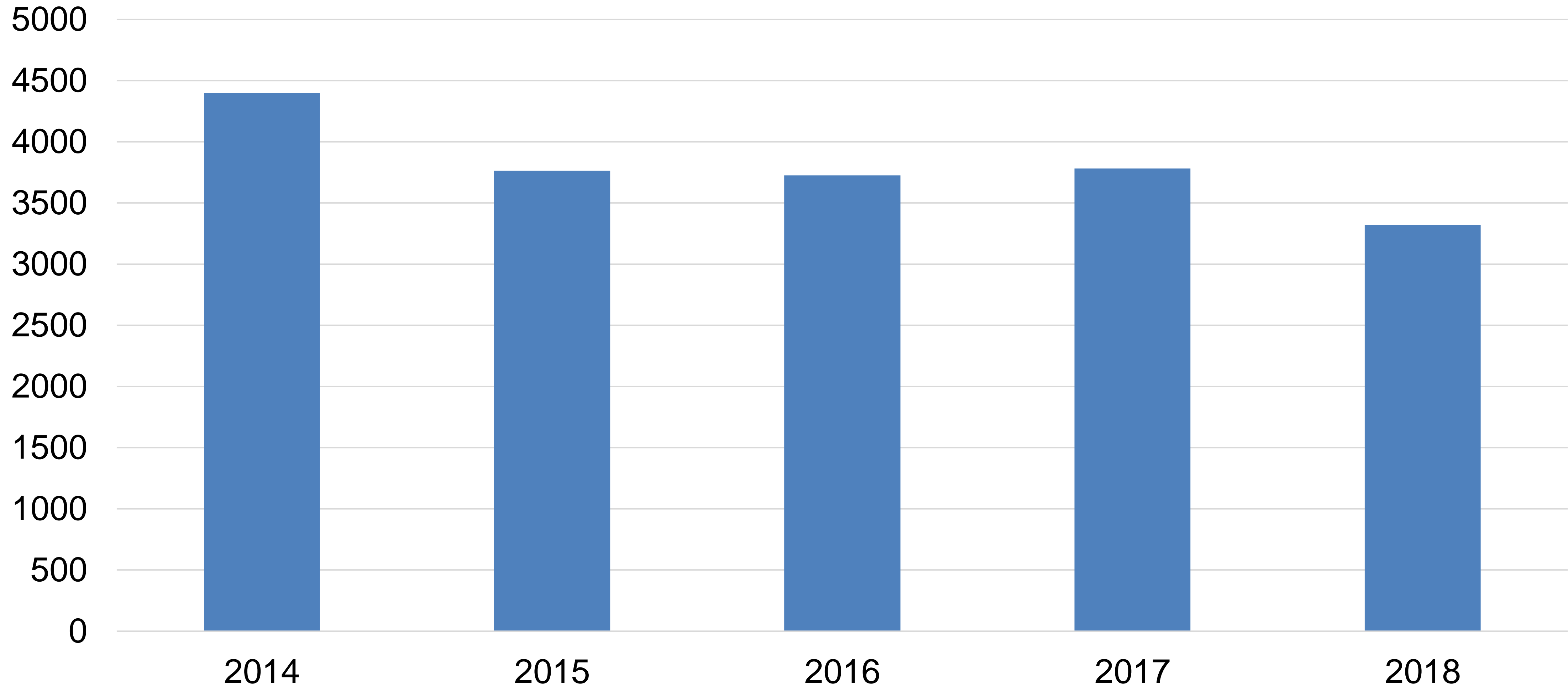
BUT

Very few organisations know/review if their previous actions to address findings/events were effective!



CAA Airworthiness Findings 2014-2018

Civil Aviation Authority



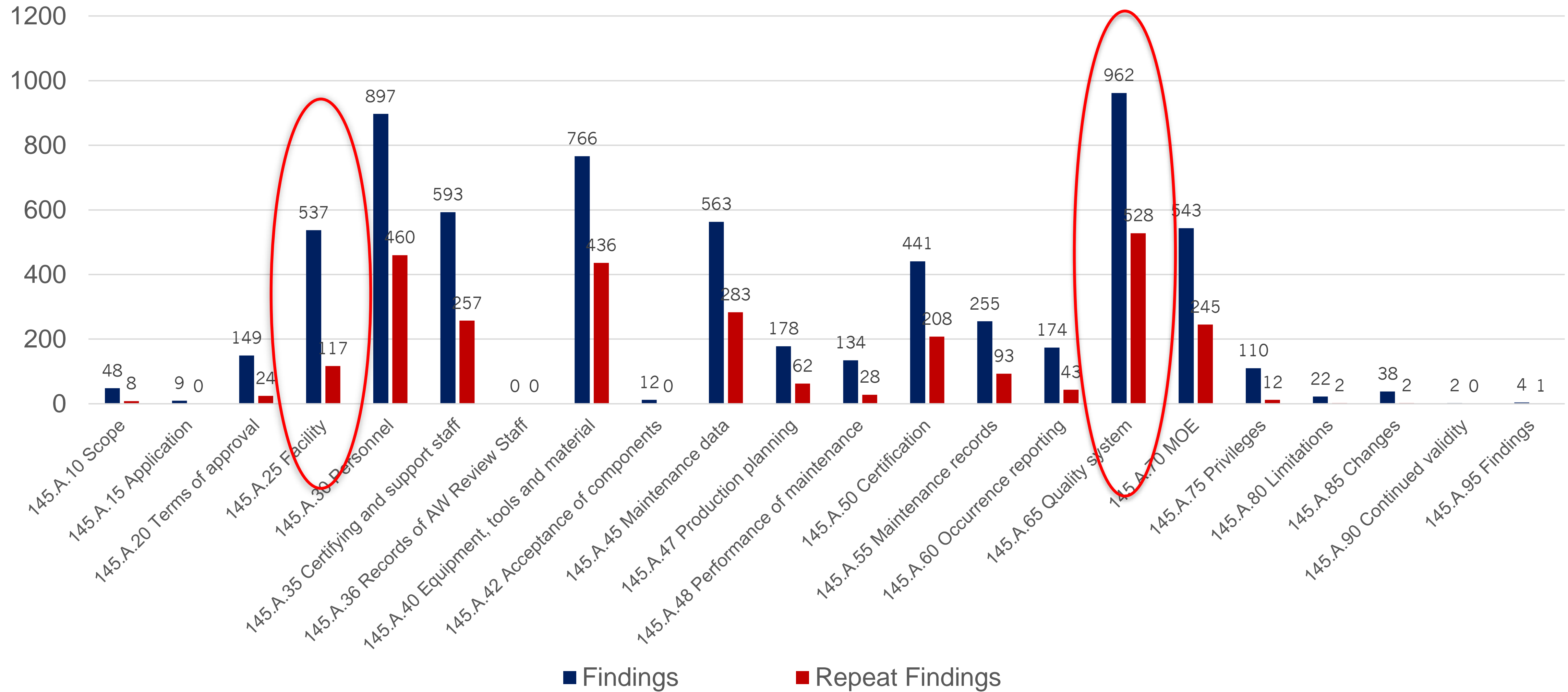
Repeat Findings

- Large proportion of AW findings raised in the past 5 years are repeat findings
  - 44% for Pt 145
  - 35% for Pt M

- Getting to the true root cause can lead to cost savings via
  - Reduction of repeat findings
  - Better use of manpower resources
  - Operational efficiencies

CAA AW Part 145 Findings
2014 - 2019

Civil Aviation Authority



CAA AW Part M Findings
2014 - 2019

Reference	Category	Repeat findings	Findings
M.A.201	Responsibilities	36	121
M.A.202	Occurrence Reporting	17	77
M.A.301	Continuing airworthiness tasks	24	95
M.A.302	Aircraft Maintenance Programme	124	294
M.A.303	Airworthiness Directives	5	36
M.A.304	Data for modifications and repairs	2	35
M.A.305	Record System	33	131
M.A.306	Aircraft technical log system	30	104
M.A.307	Records Transfer	1	12
M.A.704	CAME	130	313
M.A.705	Facilities	1	18
M.A.706	Personnel Requirements	113	261
M.A.707	Airworthiness review staff	16	82
M.A.708	Continuing airworthiness management	103	266
M.A.710	Airworthiness review	20	87
M.A.711	Privileges	22	71
M.A.712	Quality System	233	431
M.A.713	Changes	2	17
M.A.714	Record -keeping	8	44
M.A.716	Findings	2	12

Y-axis: 0, 100, 200, 300, 400, 500

■ Repeat findings ■ Findings

Percentage of Rejected Responses to CAA Findings

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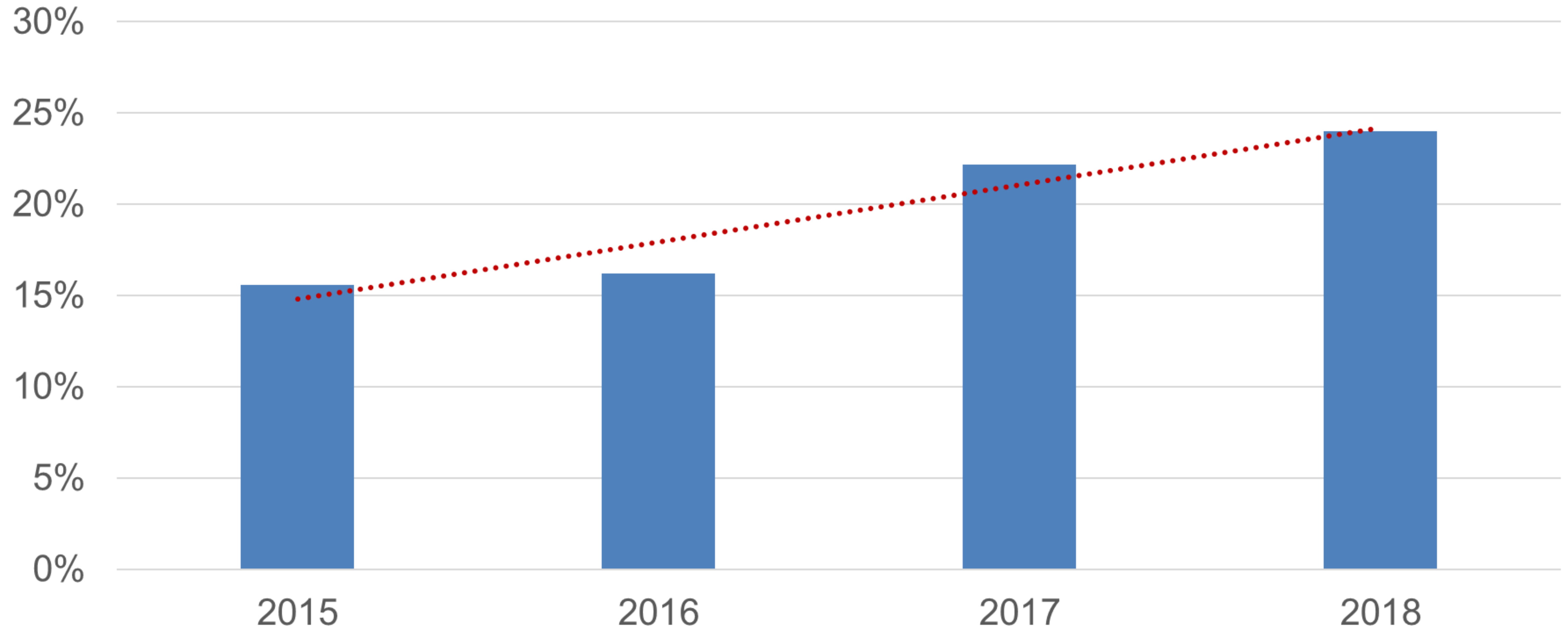
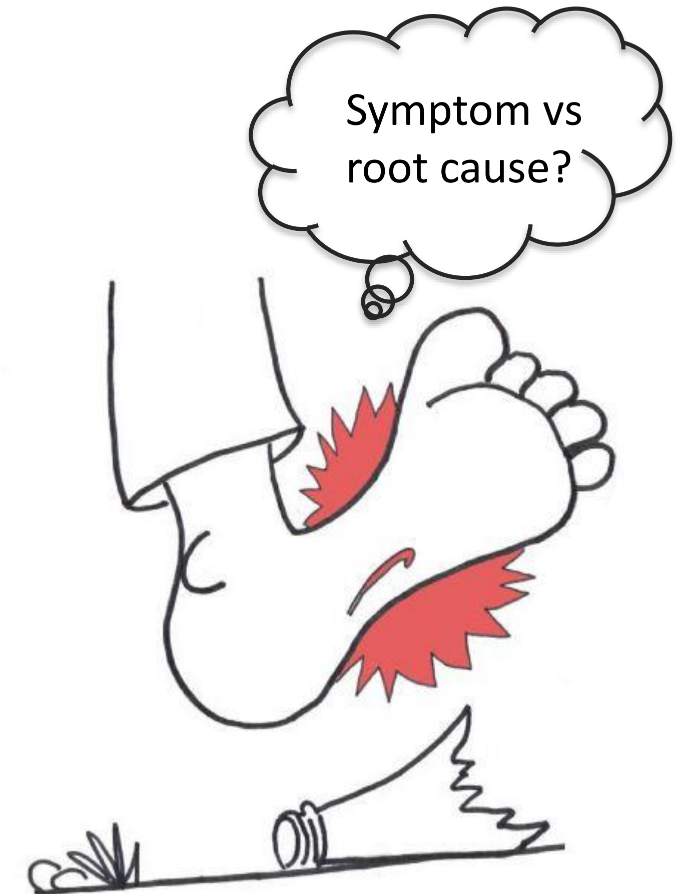


Common Issues

- No root cause identified
- Focus on event/finding (symptom) rather than root cause
- Inadequate root cause - did not consider the wider system
- Corrective and/or preventive actions not defined
- No process/procedure for root cause analysis
- Action owners not trained in root cause analysis



The Finding is NOT the Root Cause

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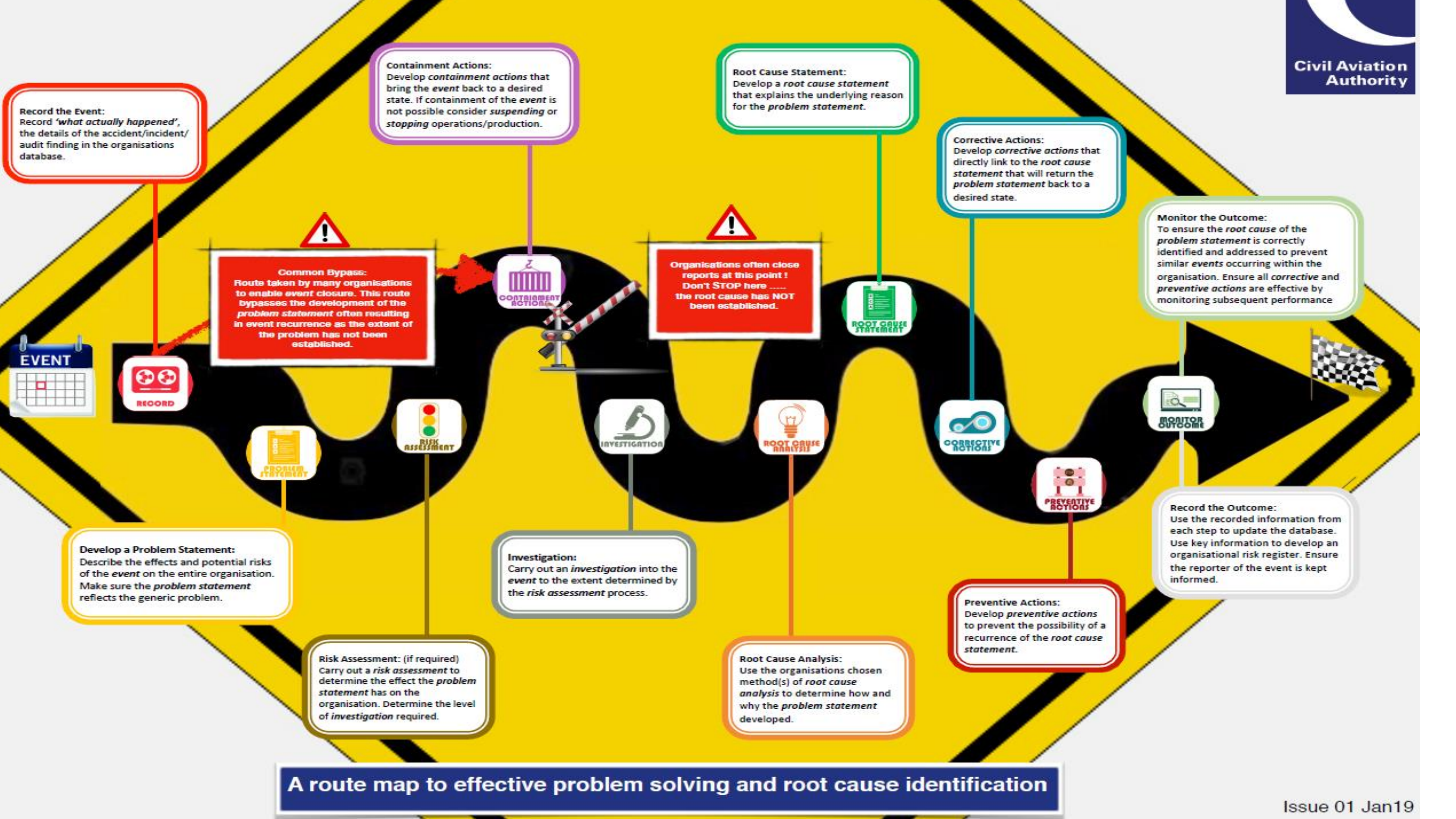
CAA Finding - 145.A.25 Facility Requirements

The stores facility contained sealants, grease and oils which were not stored in a suitable flame vault as required by the manufacturer's storage recommendations.

Organisation's Response to Finding

Root cause: All sealants, greases and oils products should be stored adequately but safely to prevent, inadvertent use, spillage and contamination of both the product and work area. How sealants, greases and oil products are stored at present is considered inadequate and contrary to normal housekeeping procedures.



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Record the Event: Record 'what actually happened', the details of the accident/incident/ audit finding in the organisations database.
Containment Actions: Develop containment actions that bring the event back to a desired state. If containment of the event is not possible consider suspending or stopping operations/production.
Root Cause Statement: Develop a root cause statement that explains the underlying reason for the problem statement.
Corrective Actions: Develop corrective actions that directly link to the root cause statement that will return the problem statement back to a desired state.
Monitor the Outcome: To ensure the root cause of the problem statement is correctly identified and addressed to prevent similar events occurring within the organisation. Ensure all corrective and preventive actions are effective by monitoring subsequent performance
Common Bypass: Route taken by many organisations to enable event closure. This route bypasses the development of the problem statement often resulting in event recurrence as the extent of the problem has not been established.
Organisations often close reports at this point ! Don't STOP here ..... the root cause has NOT been established.
EVENT
RECORD
PROBLEM STATEMENT
RISK ASSESSMENT
CONTAINMENT ACTIONS
INVESTIGATION
ROOT CAUSE ANALYSIS
ROOT CAUSE STATEMENT
CORRECTIVE ACTIONS
PREVENTIVE ACTIONS
MONITOR OUTCOME
Develop a Problem Statement: Describe the effects and potential risks of the event on the entire organisation. Make sure the problem statement reflects the generic problem.
Risk Assessment: (if required) Carry out a risk assessment to determine the effect the problem statement has on the organisation. Determine the level of investigation required.
Investigation: Carry out an investigation into the event to the extent determined by the risk assessment process.
Root Cause Analysis: Use the organisations chosen method(s) of root cause analysis to determine how and why the problem statement developed.
Preventive Actions: Develop preventive actions to prevent the possibility of a recurrence of the root cause statement.
Record the Outcome: Use the recorded information from each step to update the database. Use key information to develop an organisational risk register. Ensure the reporter of the event is kept informed.
A route map to effective problem solving and root cause identification
Issue 01 Jan19

Myth-busting! Frequent but Ineffective Actions

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- The XXX personnel were spoken to regarding this audit finding. They are now aware of full requirements of XXX procedure.
- The users of tool boxes have been communicated to on the importance of using the correct issue of documentation.
- Internal discussion to remind all staff of the possible safety implications associated with this type of event.

CAA Root Cause Policy

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- Policy is applicable to
  - Internal Quality audit findings
  - CAA audit findings
  - MORs
- Initially, focus on responses to Level 1 and High Risk Level 2 findings
- Full process not necessary in all cases
  - Dependent on complexity
  - As a minimum, establish if one-off

Airworthiness SMS Rule Making

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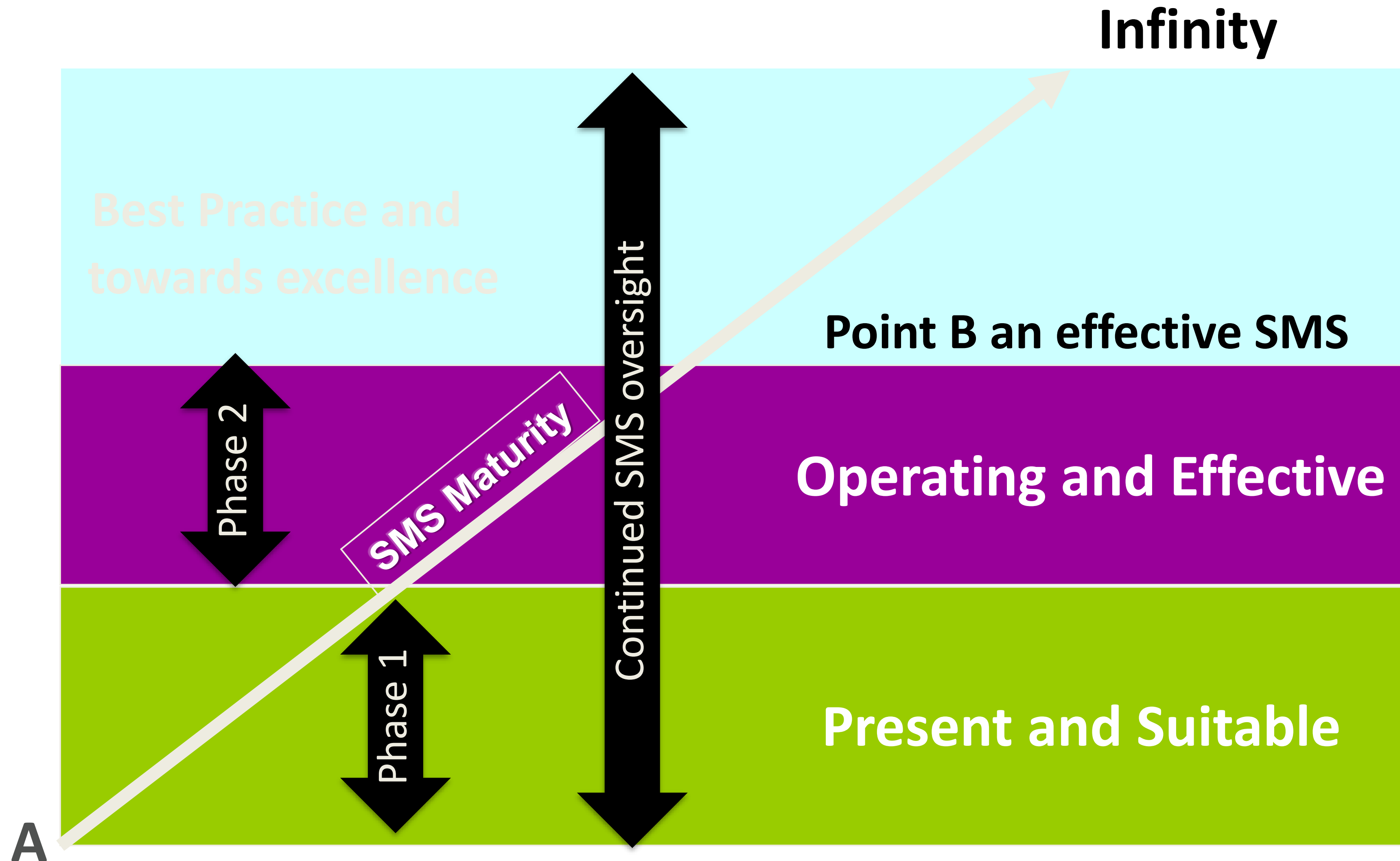
- Part CAMO.A.200 (entry into force expected early 2020)
- Includes SMS and human factors requirements
- New Rule making Task combining Part 21 and 145
    - NPA comments discussed October/November 2019
    - Entry into force expected in 2021
- Brexit may have an impact on entry into force dates

SMS evaluation



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The PSOE Approach

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- **Present:** There is evidence that the ‘marker’ is clearly visible and is documented within the organisation’s SMS Documentation
- **Suitable:** The marker is suitable based on the size, nature, complexity and the inherent risk in the activity
- **Operating:** There is evidence that the marker is in use and an output is being produced
- **Effective:** There is evidence that the element or component is effectively achieving the desired outcome

Assessment of Individual Markers

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COMPLIANCE + PERFORMANCE MARKERS		P	S	O	E	How it is achieved	What to look for	CAA Remarks
1.1.1	There is a confidential reporting system that complies with EU 376/2014 to captures errors, hazards and near misses that is simple to use and accessible to all staff and provides appropriate feedback to the reporter and where appropriate, to the rest of the organisation.						Reporting System (in addition to MORs) is available to all personnel and is in use; Staff familiar with it; Review how data protection and confidentiality is achieved? Assess volume, content and quality of reports Evidence of feed back to reporter, the organisation and third parties. Safety reports are acted on in a timely manner. Check availability to contracted organisations and customers to make reports.	
1.1.2C	Personnel express confidence and trust in the organisations reporting policy.						Question all levels of personnel; Number and variety of safety reports; Evidence of self reporting; Feedback from staff surveys.	

SMS Evaluation Summary

	Initiating	Present and suitable	Operating	Effective	Excellence
Human Factors Management	Human Factors is considered but not formally captured by the organisation.	Human Factors policies and processes have been defined and documented where required by regulation.	Human Factors is being managed across the organisation and is starting to be integrated into the organisation's SMS.	Human Factors is integrated into the SMS and the operations of the organisation. All staff including management are aware of human factors and apply it in the way they work.	Human Factors is embedded into the day to day activities of the organisation and fully integrated into the SMS. This is evident throughout the organisation from senior management to front line staff.

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CAA SMS Guidance

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- https://www.caa.co.uk/Safety-initiatives-and-resources/Working-with-industry/Safety-management-systems/Safety-management-systems/

ANY QUESTIONS ...