

Version 1.0

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Maintenance Competency-Based Training Assessments (MCBTA)

Recommended practices



HeliOffshore
Safety Through Collaboration

Glossary

AMC	Acceptable Means of Compliance
CBTA	Competency-Based Training and Assessment
CMS	Competency Management System
EASA	European Aviation Safety Agency
EBT	Evidence-Based Training
HSE	Health and Safety Executive
IATA	International Air Transport Association
ICAO	International Civil Aviation Organisation
MCBTA	Maintenance Competency-Based Training and Assessment
RAeS	Royal Aeronautical Society
UK CAA	United Kingdom Civil Aviation Authority

Safety Through Collaboration

Collaboration empowers safety and is at the very heart of HeliOffshore. This Maintenance Competency-Based Training Assessment (MCBTA) Recommended Practice is a great example of how our industry identifies improvement opportunities, works together and learns from each other to ensure no lives are lost in offshore aviation.

I would like to thank the industry stakeholders and every HeliOffshore member who contributed to the development and delivery of this guidance. Thank you for your commitment and contribution. Together, we will implement and sustain ever-higher levels of performance so those we are responsible for travel home safely every day.

Tim Rolfe
CEO, HeliOffshore

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This document is not intended to replace any contractual negotiations, agreements or requirements between helicopter operators and their customers.

Section 1 Executive Summary



Section 1

Executive Summary

In the modern maintenance environment, there are a number of roles within an organisation and each one of them requires certain strengths and abilities that draw on both non-technical and technical skills.

The benefits of a comprehensive and functioning Competency Management System (CMS) for a business are many. It allows for a company to assess availability of skillsets at a corporate and individual level, determine whether current training is sufficient, and help plan for future development of the workforce. For the candidate, it is an opportunity to discuss their strengths and weaknesses, identify where they feel that more training would be beneficial, and to discuss their responsibilities within the organisation. Confirming the company's expectations of them and their job description may lead to increased performance.

Communication is key for the process. Opening a two-way dialogue between the assessor and assessed candidate sets the tone for future competency assessment periods. This process should form part of the induction program and information should also continue to be shared through mediums such as Continuation Training. The process is dependent on both parties feeling confident that they can convey their thoughts on the process and agree on future training, role and authorisations.

It is important that these skills are assessed alongside practical experience to determine not only the depth and availability of skills at a company, but also to determine future planning of training and support for the workforce. This support is not only restricted to manning levels but, by open conversation, can be used to assess where there might be shortfalls within the organisation regarding infrastructure such as tooling, hangarage and safety concerns.

An investment in competency assessment is an investment in the company, its people, and its future planning. Whilst there are legislative minimum requirements, dependent on geographical placement, it would be prudent for any organisation to exceed these with the aim of enhanced appreciation of training needs, greater data harvesting, closer interaction and trust building. For the individual this may present an opportunity for further enhancement of responsibilities, definition of career path and growth.

Section 2 Introduction

The background image shows a worker in a high-visibility yellow vest and dark shirt working on a large, complex engine or machinery in a factory or industrial setting. The scene is dimly lit with a blue tint. A large, curved blue graphic element is overlaid on the right side of the page, partially obscuring the worker's figure.

Section 2

Introduction

Competency can be described as “A dimension of human performance that is used to reliably predict successful performance on the job. A competency is manifested and observed through behaviors that mobilise the relevant knowledge, skills and attitudes to carry out activities or tasks under specified conditions.” (IATA, 2021)

The modern-day airworthiness professional regardless of whether they work in Continuing Airworthiness, Planning or on the hangar floor as a Certifying Engineer or mechanic, now have to employ a wider range of skills that may not have been part of their job description in past generations. There are now further demands on a maintenance professionals time and mindset that may impinge on their ability to do the task required. It is important that there is a mechanism in place to allow the organisation and the individual to assess their performance. By reviewing these skills, it offers an opportunity for personal development as well as business development.

Competency assessments have been in use since the 1950s in wider society with the general formalisation of a framework by psychologists at Harvard University that would allow measuring competencies. These

are underlying traits that can translated to data that can be developed to help effective strategies to improve performance.

Reviewing competence has been commonplace amongst the safety critical sections, Aircrew, Air Traffic Control and Maintenance, of the operational side of aviation for some time with research mainly concentrated on Aircrew with regulation regarding this in place amongst all the regulation authorities. There has, however, been significant research carried out by the UK CAA with the release of CAP 1715 and ICAO with DOC 10098 recently that has put the spotlight on guiding organisations on the standards required. EASA has stipulated that CBTA is a requirement for maintenance personnel as stated in their latest Acceptable Means of Compliance (AMC).

Reviewing the competency skills and gaps within an organisation allows for the analysis of performance of the business. It also allows for further analysis of behaviour patterns within certain sections and job descriptions, by using this data it could be possible to plan for future strategies, manpower expectations and planning. For the individual it also represents an opportunity to assess their own performance and look forward to where possible future personal development.

Nearly 20% of fatal accidents in the offshore aviation industry are attributed to System Reliability and Resilience (HeliOffshore, 2020). These incidents include both technical and the human interface element. Whilst there has significant research in the field of Human Factors and Human Performance, the human part of the process is the one that can lead to a variation

of errors (HSE, 2022). CBTA has a role in identifying areas which may lead to errors as well as providing a tool to encourage feedback in the systems put in place. In the wider aviation sector, it was observed that of the maintenance related AAIB safety reports that 60% of incidents were attributed to incorrectly installed components, see *Figure 1*, (RAeS, 2022).

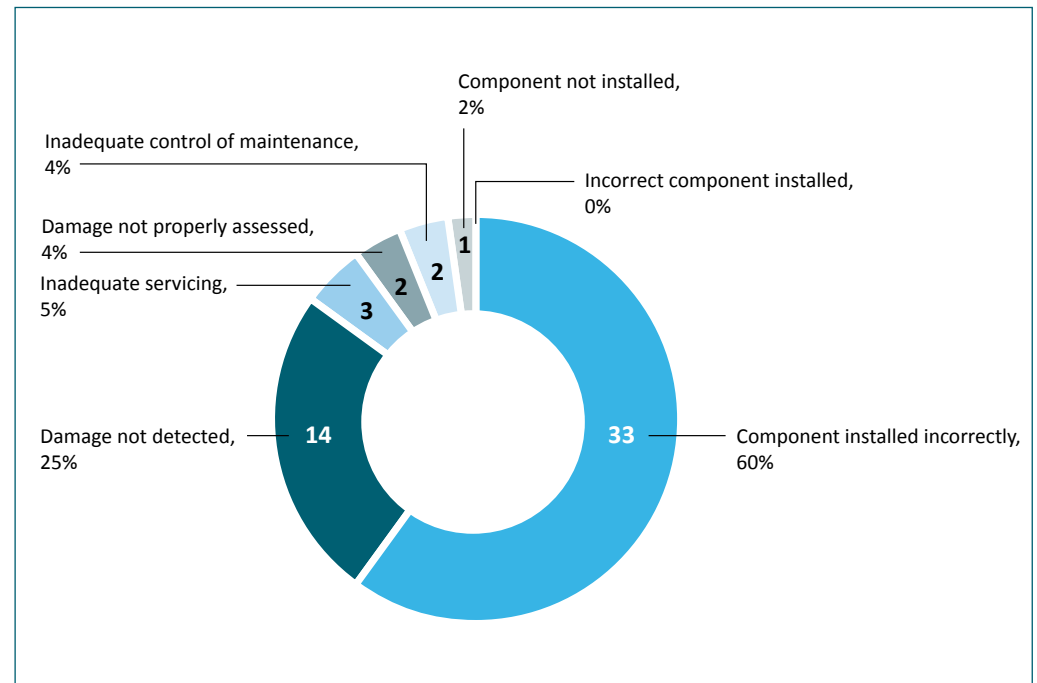


Figure 1, Type of Maintenance Error identified in the analysis of AAIB Reports

As part of the HeliOffshore Safety Performance Model 'System Failure', Figure 2, is one of the prime accident events and there are a number of prevention goals linked to System Failure that can be achieved with a robust Competency Management System (CMS). Competency is one of the enablers within the model that can bring positive change to the operations carried out by an organisation.

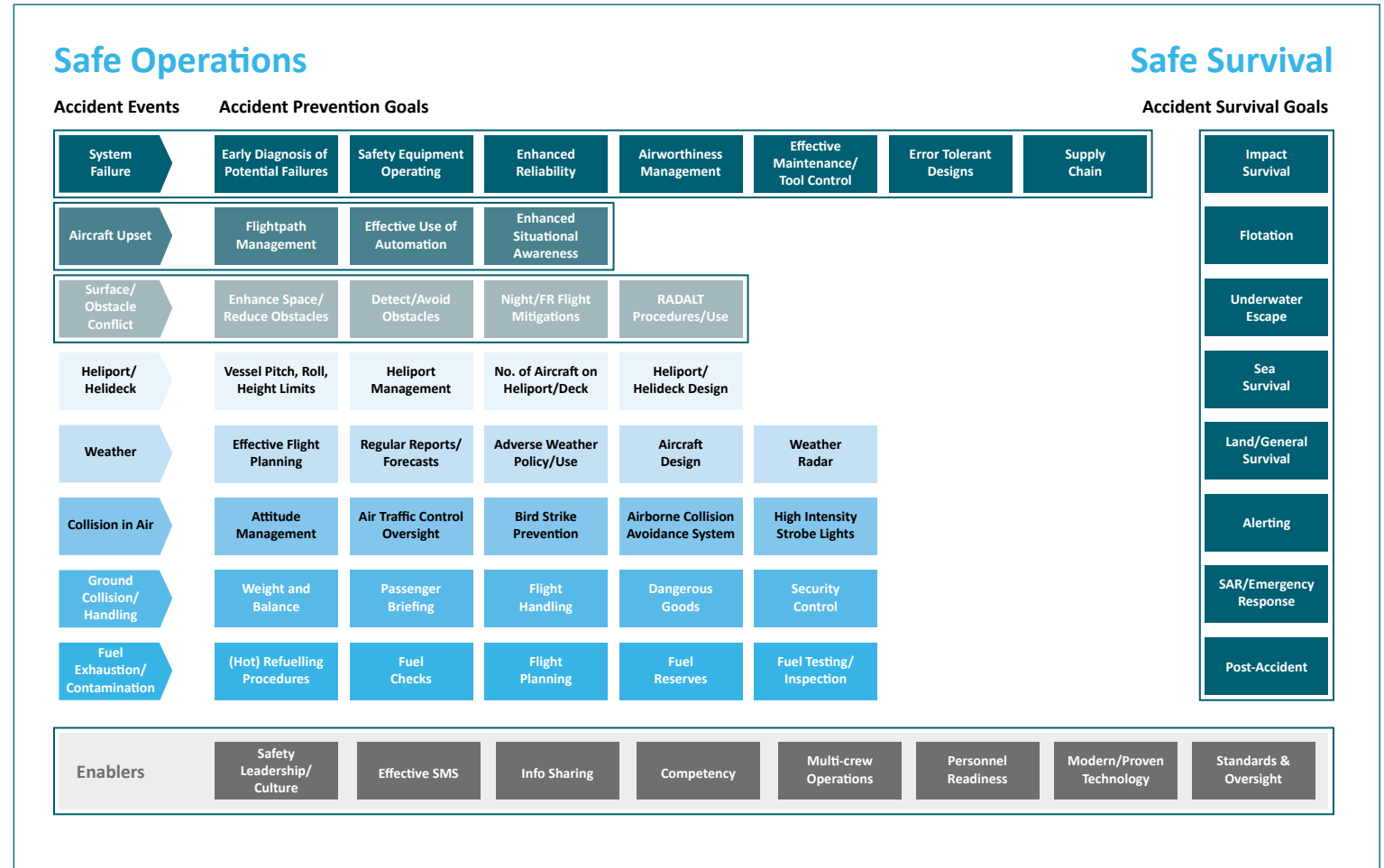


Figure 2, HeliOffshore Safety Performance Model

Section 3 Competency-Based Training and Assessment (CBTA)



Section 3

Competency-Based Training and Assessment (CBTA)

CBTA is a performance assessment tool that uses the training, knowledge, and experience of a candidate to assess their capability to carry out their tasks. This system can also be used to define future training and development scenarios.

The organisation can also utilise the data to evaluate their capabilities as a company regarding the strengths of the workforce, future training requirements and current capacity. CBTA is a system which, if installed correctly, can provide a link to improve communication and trust between all parties.

An element of CBTA is Evidence-Based Training (EBT). Due to the nature of the work of the technical staff the use of this program allows for their experience and training to assess their capabilities and their future requirements to continue their development. The advantage of EBT in the technical sector is that the candidate can produce evidence of prior work and training to establish their skill level and abilities, to add to this there are ways to replicate certain scenarios for assessment.

CBTA and EBT assessments should be carried out by a trained assessors who are familiar with the job descriptions roles and responsibilities ideally having experienced the tasks. This training can be carried out by the in-house training department or by third-party specialists.

EBT uses a set of competencies that do not necessarily distinguish between the “non-technical” and “technical” skills. ICAO and UK CAA have issued a list of competencies that this recommended practices document is based on, *a list of which can be seen in Carrying out a Competency Assessment section*.

Current regulations on CBTA

CBTA has been on the radar of regulators for years, initially focusing on aircrew and various organisations are now offering frameworks specifically aimed at the technical sector:

- **CAP 1715 Competency Assessment Guidance Document:** This document, was developed in collaboration with industry and was first published in 2018 to provide guidance on competency assessments for all aspects of the technical sector. This document details a number of “non-technical” behavioural skills that complement the technical skills required to carry out the responsibilities that are part of the candidate’s job description.
- **EASA AMC1 145.A.30 Personnel Requirements:** EASA published the latest update in 2022 of the Easy Access Rules for Continuing Airworthiness and this section defines objectives and requirements for organisations. This publication also contains suggested frameworks for knowledge elements required within certain roles (GM2 145.A.30(e)).

EASA states that the organisation is responsible for assessing competency. This document gives instruction for the role the company plays in the process.
- **ICAO Doc 10098:** First edition of the manual released in 2021. This reference guide provides advice specifically on CBTA for aircraft maintenance personnel.

Section 4

Carrying out a Competency Assessment

Execution of Competency Check

It is important that a competency interview has been arranged in good time to allow both parties to be organised regarding preparation for the discussion. The interview should be held in a place where it can be carried out undisturbed at a time convenient for both parties as well as business operations. It should follow a structure that allows for full and frank discussion in a framework to keep a standardised process for all candidates, see *Appendix 1*.

Competency Assessment methods

There are many ways to assess the candidates but essentially four different methods should be made available to both the assessor and the candidate:

- **Demonstration:** The assessor should choose a task that is within the candidate's scope of work that the candidate can discuss the process of carrying out the operation. The assessor should use this as an opportunity to ask questions about the task and the method of carrying it out.
- **Simulation:** A task should be carried out within an environment such as a simulator, workshop or where test equipment can be used to carry out the tasks. The simulation should provide a realistic situation where evidence of knowledge and skill can be evaluated.
- **Observation:** Where practicable a task can be carried out that can be witnessed and appraised by the assessor to check that all processes have been carried out to a required standard
- **Questioning:** Questions relating to the task to allow the candidate to demonstrate that they have the knowledge to complete what is required.

Roles and responsibilities of Assessors

Regardless of the job description that is being assessed there are basic skills that every assessor should possess.

- The assessor should understand the philosophy behind the CBTA program.
- Comprehensive familiarity and knowledge of the model adopted by the company this must include being able to understand the benchmarks that will be used to measure competency.
- Knowledge and experience of the job description that the candidate and the tasks and responsibilities associated with it.
- Knowledge of the documentation used by the company and regulator that may be used as evidence of competency and training.
- Human Factors/Performance.

The assessor should be part of the subject's line management team and be in a supervisory role relating to them.

Competency Factors

There are generally three distinct factors of competence that cover the range of competencies that influence the ability of a candidate to undertake their responsibilities safely and successfully. These competencies must be relevant to the workplace and the tasks carried out by the candidate. By observing the behaviours and actions of the candidate whilst carrying out or reviewing previous activities that it is possible to determine whether they have reached the accepted level of proficiency required.

- **Knowledge** – Comprehension of the task and relevant information.
- **Skills** – Capability to carry out the task efficiently, safely and correctly.
- **Attitude** – Approach to the task and the team.

ICAO and the UK CAA have defined their Competency fields, see *Appendix 2*, recommended for use in an organisation's framework. These suggested topics cover both the "non-technical" and "technical" skills required to cover all three of the Competency Factors either as one or a combination of them.

Competency Ratings

It is important that any ratings system be simple, clear and unambiguous in its usage. It should also allow for discussion between the assessor and the candidate.

In the UK CAA CAP 1715 it recommends a three-level rating system, see *Figure 3*. This allows for simple understanding of the assessor's decision about the results of their assessment and for future recommendations on the candidate's requirements or ability to undertake tasks that are within their job description.

Competency Framework Pack

As part of an assessment there should be a dedicated pack to allow for recording of the discussion, results, recommendations, copies of documentation and feedback. As part of the Competency Assessment Pack there should be a form, see *Figure 4*, to collate and record information either electronically or as a hard copy. This form should be clear and easy to follow to allow for unambiguous decision making. A suggested form would be;

Training Required	At the time of interview, the candidate cannot demonstrate adequate knowledge and understanding of the subject. It is therefore recommended that appropriate support, mentoring or training package be developed and delivered before reassessment.
Satisfactory	The candidate demonstrates sufficient knowledge and understanding of the subject that allows the candidate to perform required tasks to an acceptable standard.
Exceeds Expectations	The candidate demonstrates a high level of experience and knowledge of the subject, which allows the candidate to perform required tasks to a very high standard. The candidate should be considered for additional responsibilities as part of their personal development.

Figure 3, UK CAA CAP 1715 Competency Ratings (CAA, 2019)

1. Candidate Name.
2. Date Started: Commencement of employment within the company.
3. Competency Interval: How often is this process carried out, does it change for different roles.
4. Job Description: Different roles require different competency questions, requirements and levels.
5. Date Completed: Completion date of the entire process.
6. Staff No.: For easy record keeping.
7. Aircraft Types and/or authorisations: For recording the aircraft types held and the authorisation levels associated with the privileges the candidate holds.
8. Date Competency Completed: Date each individual competency requirement has been completed.
9. Assessor Signature.
10. Candidate Signature.
11. Topic box: Detailing which section is to be covered in the question boxes underneath, these should be relevant to the organisation, local regulator and job requirements.
12. Competency: To be used in relation to the question posed, this allows for multiple competencies to be assessed within one question.
13. Competency Result: Based on the UK CAA CAP1715 system, allows for easy decision making.

This pack should be kept as a permanent for the duration of the candidate's employment at the company.

Competency Framework

(1) Candidate Name		(2) Date Started		(3) Competency Interval				
(4) Job Description		(5) Date Completed		(6) Staff No.				
(7) Aircraft Types and/or Authorisations			Training Required	Satisfactory	Exceeds Expectations	(8) Date Competency Completed	(9) Assessor Signature	(10) Candidate Signature
(11) Organisation and Structure	(12) Competency	(13) Competency Result						
Knowledge of organisation structure, roles and responsibilities								
Knowledge of Continuing Airworthiness, Maintenance and any other relevant regulations								
Understanding of the roles and responsibilities of the Continuing Airworthiness and Maintenance Organisations								
Knowledge of Procurement processes								
Knowledge of organisation structure, roles and responsibilities								

Figure 4, Suggested framework form for use in assessments (see Appendix 3 for a blank template).

Interview process

Pre-Interview for Assessor

- Inform and agree suitable time with candidate for interview
- Distribute information on the processes involved and competencies to be assessed during the assessment to the candidate
- Organise suitable workspace for interview where it can be carried out undisturbed
- Prepare Competency Assessment pack relevant to candidate's role
- Prepare suitable questions and scenarios for discussion at the interview

Pre-Interview for Candidate

- Agree suitable time for interview and inform line manager
- Organise training records (Human Factors, Continuation Training, Type Training etc)
- Have relevant licences and company authorisations prepared
- Prepare logbook or other history of evidence relating to the competencies being assessed

During the interview

- Brief the candidate on the aims and processes of the assessment
- Introduce yourself and your role within the process
- Discuss the process and answer questions about it
- Maintain a focussed discussion on the process being assessed
- Allow for feedback, particularly around the process being assessed or the instructions to carry out the task
- Discuss the candidate's current role, responsibilities and authorisations
- Keep the interview tone respectful and ensure there is opportunity for open discussions
- Carry out the process using whatever observation tools deemed appropriate
- Discuss the decisions made and inform the candidate the reasoning behind the rating

Post Interview

- Discussion on actions required from the interview
- Set dates on further training if required
- Review process and ask for feedback from candidate

Competency re-assessment

- Discuss the retraining or remedial coaching required
- Discuss any further issues from the initial assessment
- Discuss feedback

Complete Competency Assessment

- Complete paperwork and add to candidate's file

Further opportunities for research

As stated, earlier research concentrating in the maintenance sector of aviation regarding CBTA is not an overwhelmingly popular subject matter but nevertheless there are many comparable studies in this field that offer information on it.

Regulatory and industry bodies are now issuing guidance on the implementation of the process and legislating the use of it. The opportunity is there for operators and maintenance organisations to determine how to use data to achieve positive engagement within the workforce and how to use the information for business growth.

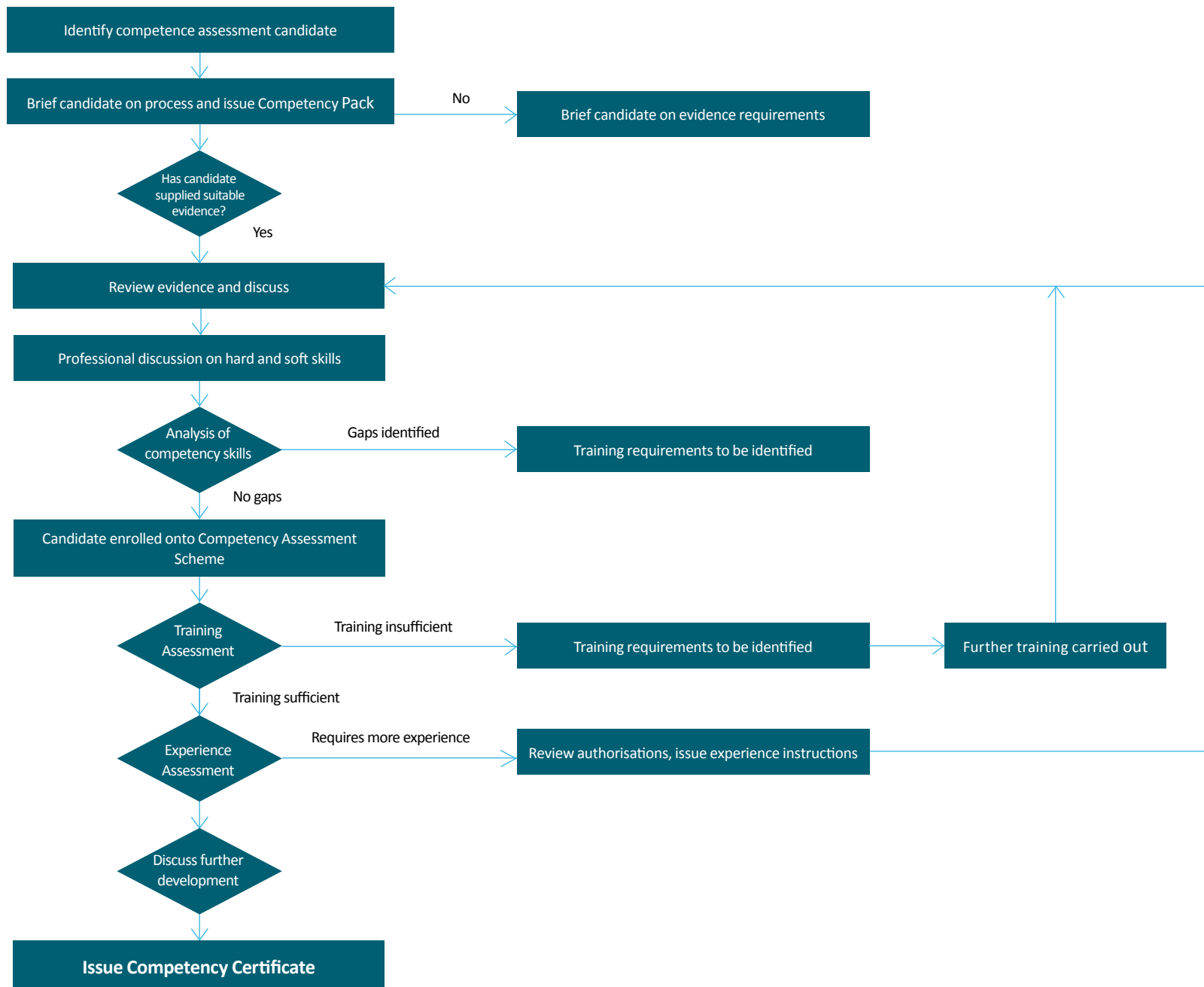
Further Reading

UK CAA CAP 1715 Competency Assessment Guidance Document
ICAO Doc 10098
EASA Easy Access Rules for Continuing Airworthiness (Regulation (EU) No 1321/2014)
UK MOD DE&S Functional Competence Framework Engineering
RAeS Development of a Strategy to Enhance Human-Centred Design for Maintenance
Engaging the Next Generation of Aviation Professionals by Kearns, Mavin and Hodge
Crew Resource Management by Kanki, Anca and Chidster

Appendices



Appendix 1



Appendix 2

Reference Number	ICAO Competency	UK CAA Competency	Suggested Benchmarks
1.	Application of Procedures		<ul style="list-style-type: none"> • Understanding of manuals • Ability to follow processes and procedures • Reports inconsistencies within procedures • Understands company reporting structure. • Can demonstrate link between procedure and programs in relation to the task.
2.	Work Management		<ul style="list-style-type: none"> • Ability to plan their and their team's workload effectively • Effective time management • Understanding of operational and commercial requirements • Ability to delegate as required. • Communicates to other team members when issues may affect the ability to carry out the task on time • Recognises deviations from normal practice and acts accordingly
3.	Situational Awareness		<ul style="list-style-type: none"> • Ability to recognise changes within a situation whether a system or human change and adapt accordingly • Ability to report changes that may lead to an unsafe environment • Recognises hazardous or potentially hazardous situations and reports them
4.	Technical Expertise		<ul style="list-style-type: none"> • Up to date logbook or evidence of work carried out • Ability to recognise and diagnose defects • Effective communication of technical concepts and information to engineering staff and other departments • Correct usage and understanding of tooling and other relevant apparatus • Knowledge of aircraft and their systems • Knowledge of environment, workshops, chemicals, tooling and applicable publications
5.	System Thinking		<ul style="list-style-type: none"> • Recognises the link between departments within a technical organisation • Recognises the relationship between policies, processes and company procedures • Recognises the importance of national and international regulations • Recognises the importance of not only a company's safety management system but also national and regulatory safety and reporting systems • Understands how systemic failures within an organisation may affect their or the company's performance
6.	Co-Ordination and Handover		<ul style="list-style-type: none"> • Examples of shift handovers • Ability to sequence tasks to create most efficient workflows • Reports hazardous situations • Effective communication and uses correct terminology to convey information that is understood
7.	Risk Management		<ul style="list-style-type: none"> • Understand company safety guidance • Know where to find and understand company risk assessments and acts accordingly • Understand hazardous substances controls • Understand and use company reporting structures

Reference Number	ICAO Competency	UK CAA Competency	Suggested Benchmarks
8.	Teamwork	Teamworking	<ul style="list-style-type: none"> • Evidence and examples of communication • Are they able to advise or offer advice to other members of the team? • How do they interact with other departments • Shows respect to team members at all levels • Accepts and gives constructive feedback
9.	Problem Solving and Decision Making	Decision Taking and Judgement Making	<ul style="list-style-type: none"> • Ability to understand systems • Proactive in decision making • Ability to anticipate potential issues • Ability to take reasoned decisions without prejudice
10.	Self-Management and Continuous Learning		<ul style="list-style-type: none"> • Up to date training • Takes responsibility for their own actions • Assesses self-performance and acts upon it • Keeps up to date on developments in aviation and related topics. • Actively in promoting developments within the technical sector, company and industry
11.	Communication		<ul style="list-style-type: none"> • Clear and informative communication to all levels • Able to convey ideas • Understand different forms of communication and when to use them • Able to listen and understand instruction and feedback • Able to ask questions when required
12.		Professionalism	<ul style="list-style-type: none"> • Takes responsibility for their own actions • Able to perform under pressure • Willing to seek and accept advice • Treats colleagues with respect • Carry out tasks diligently with respect to colleagues, operations and environment
13.		Integrity	<ul style="list-style-type: none"> • Examples of reporting issues • High standards of work • Recognising events that may lead to further issues and acting on them • Discussion of various scenarios
14.		Adaptability	<ul style="list-style-type: none"> • Ability to survey situations and adapt accordingly • Recognise errors and be able to review and act accordingly • Listening to other colleagues and respecting their point of view
15.		Leadership	<ul style="list-style-type: none"> • Confidence in decisions made • Ability to lead a team or group • Ability to motivate other team members • Ability to work with little or no supervision

Bibliography



Bibliography

UK CAA, 2019. *CAP 1715 Competency Assessment Guidance Document*, Gatwick: CAA.

HeliOffshore, 2020. *HeliOffshore Safety Performance Report*, London: HeliOffshore.

HSE, 2022. *Human factors: Managing human failures*. [Online]

Available at: <https://www.hse.gov.uk/humanfactors/topics/humanfail.htm> [Accessed 18 March 2023].

IATA, 2021. *Competency-Based Training and Assessment (CBTA) Expansion within the Aviation System*, Montreal: IATA.

RAeS, 2022. *Development of a strategy to enhance human-centred design for maintenance*, London: RAeS.

MCBTA specialists are encouraged to participate in our online, secure collaboration tool: HeliOffshore Space.

You can find out more about HeliOffshore, our safety plan, and the workstreams at www.helioffshore.org

This guidance will be updated regularly. If you have comments or suggested amendments, please email: info@helioffshore.org



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