

Safety Attribute Inspection (SAI) Data Collection Tool
1.3.20 Engine Condition Monitoring (AW)

ELEMENT SUMMARY INFORMATION

Purpose of this Element (certificate holder's responsibility):

- To provide an Engine Condition Monitoring program that includes a system for data collection and analysis that ensures timely analysis and correction of engine problems.

Objective (FAA oversight):

- To determine if the certificate holder's Engine Condition Monitoring program meets all applicable requirements of Title 14 of the Code of Federal Regulations (14 CFR) and FAA policies.
- To determine if the certificate holder's Engine Condition Monitoring program incorporates the safety attributes.
- To identify any shortfalls in the certificate holder's Engine Condition Monitoring program.

Specific Instructions:

- Intentionally left blank

SUPPLEMENTAL INFORMATION

Specific Regulatory Requirements (SRRs):

- SRRs:
 - 121.135(a)(1)
 - 121.135(b)(1)
 - 121.135(b)(2)
 - 121.135(b)(3)
 - 121.374(h)(2)(j)(1)
 - 121.374(h)(2)(j)(2)
 - 121.374(h)(2)(j)(3)
 - D.086

Related CFRs & FAA Policy/Guidance:

- Related CFRs:
 - Intentionally left blank
- FAA Policy/Guidance:
 - FAA Order 8900.1, Volume 4, Chapter 6, Section 3
 - Advisory Circular 25-13
 - Advisory Circular 120-42A

SAI Section 1 - Procedures Attribute

Objective: Procedures, instructions, and information are documented methods for accomplishing a process. The certificate holder's policies should establish their compliance posture. Policies may be stand-alone statements, or they may be imbedded within procedures, instructions, or information regarding a particular regulatory requirement. The questions in this section of the data collection tool (DCT) are designed to assist the inspector in determining if the certificate holder has documented or prescribed methods of accomplishing the process requirements that provide answers to the associated questions regarding who, what, when, where, and how. This section contains policy questions, procedural questions, and instructional or informational questions pertaining to various types of certificate holder requirements such as actions, prohibitions, or resources (i.e., personnel, facilities, equipment, technical data, etc.).

Tasks

	To meet this objective, the inspector must accomplish the following tasks:
1.	Review the information listed in the Supplemental Information section of this DCT.
2.	Review the duties and responsibilities for management and other personnel identified by the certificate holder who accomplish the Engine Condition Monitoring program.
3.	Review the certificate holder's Engine Condition Monitoring program to ensure it contains the policies, procedures, instructions and information necessary for personnel to perform their duties and responsibilities with a high degree of safety.

Questions

	To meet this objective, the inspector must answer the following questions:	
1.	Does the certificate holder's Engine Condition Monitoring process meet the specific regulatory and FAA policy requirements for a Engine Condition Monitoring program:	
1.1.	Does the certificate holder specify it will have an ETOPS engine condition monitoring program to detect deterioration at an early stage and to allow for corrective action before safe operation is affected? SRRs: 121.374(h)(2)(j)(1)	<input type="checkbox"/> Yes <input type="checkbox"/> No, Explain <input type="checkbox"/> Not Applicable
1.2.	Does the certificate holder specify the ETOPS Engine Condition Monitoring program must describe the parameters to be monitored, the method of data collection, the method of analyzing data, and the process for taking corrective action? SRRs: 121.374(h)(2)(j)(2)	<input type="checkbox"/> Yes <input type="checkbox"/> No, Explain <input type="checkbox"/> Not Applicable
1.3.	Does the certificate holder specify the ETOPS Engine Condition Monitoring Program must ensure that engine-limit margins are maintained so that a prolonged engine-inoperative diversion may be conducted at approved power levels and in all expected environmental conditions without exceeding approved engine limits? SRRs: 121.374(h)(2)(j)(3)	<input type="checkbox"/> Yes <input type="checkbox"/> No, Explain <input type="checkbox"/> Not Applicable
1.4.	Does the certificate holder specify the ETOPS Engine Condition Monitoring Program includes approved limits for items such as rotor speeds and exhaust gas temperatures? SRRs: 121.374(h)(2)(j)(3)	<input type="checkbox"/> Yes <input type="checkbox"/> No, Explain <input type="checkbox"/> Not Applicable
1.5.	Does the certificate holder's Engine Condition Monitoring program comply with	<input type="checkbox"/> Yes

	guidance contained in FAA Order 8900.1?	<input type="checkbox"/> No, Explain
1.6.	Does the certificate holder's Engine Condition Monitoring program comply with guidance contained in Advisory Circular (AC) 25-13?	<input type="checkbox"/> Yes <input type="checkbox"/> No, Explain
1.7.	If applicable, does the certificate holder's Engine Condition Monitoring program comply with guidance contained in AC 120-42A, Extended Range Operations with Two Engine Airplanes (ETOPS)?	<input type="checkbox"/> Yes <input type="checkbox"/> No, Explain <input type="checkbox"/> Not Applicable
2.	<p>Does the certificate holder s manual contain general policies for the Engine Condition Monitoring program that comply with the SRRs? SRRs: 121.135(b)(1); D.086</p> <p><i>Related Design JTIs:</i></p> <p>1. Check that the Certificate Holder's manual includes a general policy regarding the requirement that they are primarily responsible for the airworthiness of its aircraft engines, and parts thereof.</p> <p><i>Sources:</i> 121.135(b)(1)</p> <p><i>Interfaces:</i> 1.1.1(AW); 1.2.3(AW); 1.2.4(AW); 1.3.1(AW); 1.3.2(AW); 1.3.9(AW); 1.3.11(AW); 1.3.14(AW); 1.3.15(AW); 1.3.23(AW); 2.1.1(AW); 2.1.1(OP); 2.1.2(AW); 2.1.2(OP); 2.1.3(AW); 2.1.3(OP); 2.1.4(AW); 2.1.4(OP); 4.2.1(AW)</p>	<input type="checkbox"/> Yes <input type="checkbox"/> No, Explain
3.	<p>Does the certificate holder's manual reference the appropriate Federal Aviation Regulations listed in the Supplemental Information section of this safety attribute inspection (SAI)?</p> <p>SRRs: 121.135(b)(3)</p>	<input type="checkbox"/> Yes <input type="checkbox"/> No, Explain
4.	<p>Does the certificate holder's manual contain the duties and responsibilities for personnel who will accomplish the Engine Condition Monitoring program?</p> <p>SRRs: 121.135(b)(2)</p>	<input type="checkbox"/> Yes <input type="checkbox"/> No, Explain
5.	<p>Does the certificate holder's manual include instructions and information for personnel to meet the requirements of the Engine Condition Monitoring program?</p> <p>SRRs: 121.135(a)(1)</p>	<input type="checkbox"/> Yes <input type="checkbox"/> No, Explain

SAI Section 1 - Procedures Attribute Drop-Down Menu	
1.	No procedures, policy, instructions or information specified.
2.	Procedures or instructions and information do not identify (who, what, when, where, how).
3.	Procedures, policy or instructions and information do not comply with CFR.
4.	Procedures, policy or instructions and information do not comply with FAA policy and guidance.
5.	Procedures, policy or instructions and information do not comply with other documentation (e.g., manufacturer's data, Jeppesen's Charts, etc.).
6.	Procedures, policy or instructions and information unclear or incomplete.
7.	Documentation quality (e.g., unreadable or illegible).
8.	Procedures, policy or instructions and information inconsistent across Certificate Holder manuals (FOM - Flight Operations Manual to GMM - General Maintenance Manual, etc.).
9.	Procedures, policy or instructions and information inconsistent across media (e.g., paper, microfiche, electronic).
10.	Resource requirements incomplete (personnel, facilities, equipment, technical data).
11.	Other.

SAI Section 2 - Controls Attribute

Objective: Controls are checks and restraints designed into a process to ensure a desired result. The questions in this section of the DCT are designed to assist the inspector in determining if checks and restraints are designed into the process to ensure the desired result is achieved. Controls should be written into the system to ensure that the most important policies, procedures, or instructions and information will be followed.

Controls may be in the form of administrative controls, which are secondary or supplemental written procedures. Like written procedures, administrative controls also need to provide answers to questions regarding who, what, when, where, and how. Controls may also be in the form of engineered controls, such as automated features or mechanical actions or devices (i.e., safety devices, warning devices, etc.).

Tasks

To meet this objective, the inspector must accomplish the following tasks:

1. Review the control questions below.
2. Review the certificate holder's policies, procedures or instructions, and information to gain an understanding of the controls that it has documented.

Questions

	To meet this objective, the inspector must answer the following questions:	
1.	Are the following controls built into the Engine Condition Monitoring program:	
1.1.	Is there a control or controls in place to ensure the personnel working the program are adequately trained?	<input type="checkbox"/> Yes <input type="checkbox"/> No, Explain
1.2.	Is there a control or controls in place to ensure that the data collected by the Engine Condition Monitoring program produces adequate reports to support the program?	<input type="checkbox"/> Yes <input type="checkbox"/> No, Explain
1.3.	Is there a control or controls in place to ensure that the program is designed to prevent internal failure of the engines it controlled?	<input type="checkbox"/> Yes <input type="checkbox"/> No, Explain
1.4.	Is there a control or controls in place to ensure that corrective action is timely initiated and documented?	<input type="checkbox"/> Yes <input type="checkbox"/> No, Explain
1.5.	Is there a control or controls in place to ensure that takeoff demonstrations are performed and recorded?	<input type="checkbox"/> Yes <input type="checkbox"/> No, Explain
1.6.	Is there a control or controls in place to ensure that the Engine Condition Monitoring parameters are clearly documented?	<input type="checkbox"/> Yes <input type="checkbox"/> No, Explain
2.	Does the certificate holder have a documented method for assessing the impact of any changes made to the controls in the Engine Condition Monitoring program?	<input type="checkbox"/> Yes <input type="checkbox"/> No, Explain

SAI Section 2 - Controls Attribute Drop-Down Menu	
1.	No controls specified.
2.	Documentation for the controls do not identify (who, what, when, where, how).
3.	Controls incomplete.
4.	Controls could be circumvented.
5.	Controls could be unenforceable.
6.	Resource requirements incomplete (personnel, facilities, equipment, technical data).
7.	Other.

SAI Section 3 - Process Measurement Attribute

Objective: Process measurements are used by the certificate holder to measure and assess its processes, to identify and correct problems or potential problems, and to make improvements to the processes. The questions in this section of the DCT are designed to assist the inspector in determining if the certificate holder measures or assesses information to identify, analyze, and document potential problems with the process. Process measurements are a certificate holder's internal evaluation or auditing of the most important policies, procedures, or instructions and information associated with an element.

To prevent the duplication of work, process measurements are most commonly addressed through a combination of auditing features contained in both the certificate holder's safety program/internal evaluation program (for operations and cabin safety-related issues) and the auditing function of the Continuous Analysis and Surveillance System (for airworthiness or maintenance/inspection-related issues). The director of safety and the quality assurance department often work together to accomplish this function for the certificate holder. This approach requires amendment of the safety program/internal evaluation program audit forms or checklists and the Continuous Analysis and Surveillance System audit forms or checklists to include the specific process measurements for each element.

Tasks

	To meet this objective, the inspector must accomplish the following tasks:
1.	Review the process measurement questions below.
2.	Review the certificate holder's policies, procedures or instructions, and information to gain an understanding of the process measurements that it has documented.

Questions

	To meet this objective, the inspector must answer the following questions:	
1.	Does the certificate holder's Engine Condition Monitoring program include the following process measurements:	
1.1.	Is there a process measurement or process measurements that would identify if the personnel working the program were not adequately trained?	<input type="checkbox"/> Yes <input type="checkbox"/> No, Explain
1.2.	Is there a process measurement or process measurements that would identify if data collected from the Engine Condition Monitoring program did not produce adequate reports to support the program?	<input type="checkbox"/> Yes <input type="checkbox"/> No, Explain
1.3.	Is there a process measurement or process measurements that would identify if the program was not designed to prevent internal failure of the engines it controlled?	<input type="checkbox"/> Yes <input type="checkbox"/> No, Explain
1.4.	Is there a process measurement or process measurements that would identify if the certificate holder's corrective action was not timely and documented?	<input type="checkbox"/> Yes <input type="checkbox"/> No, Explain
1.5.	Is there a process measurement or process measurements that would identify if the certificate holder's full-power takeoff demonstration was not performed and recorded?	<input type="checkbox"/> Yes <input type="checkbox"/> No, Explain
1.6.	Is there a process measurement or process measurements that would identify if the Engine Condition Monitoring parameters were not clearly documented?	<input type="checkbox"/> Yes <input type="checkbox"/> No, Explain

2.	Is there a process measurement or process measurements that would reveal if the certificate holder's policy, procedures, instructions, and information were not followed?	<input type="checkbox"/> Yes <input type="checkbox"/> No, Explain
3.	Does the certificate holder document its process measurement results?	<input type="checkbox"/> Yes <input type="checkbox"/> No, Explain
4.	Does the certificate holder use its process measurement results to improve its programs?	<input type="checkbox"/> Yes <input type="checkbox"/> No, Explain
5.	Does the organization that conducts the process measurements have direct access to the person with responsibility for the Engine Condition Monitoring program?	<input type="checkbox"/> Yes <input type="checkbox"/> No, Explain

SAI Section 3 - Process Measurement Attribute Drop-Down Menu	
1.	No process measurements specified.
2.	Documentation for the process measurements does not identify (who, what, when, where, how).
3.	Inability to identify negative findings.
4.	No provisions for implementing corrective actions.
5.	Ineffective follow-up to determine effectiveness of corrective actions.
6.	Resources requirements (personnel, facilities, equipment, technical data).
7.	Other.

SAI Section 4 - Interfaces Attribute

Objective: Interfaces are used by the certificate holder to identify and manage the interactions between processes. The questions in this section of the DCT are designed to assist the inspector in determining whether or not interactions between the policies, procedures, or instructions and information associated with other independent processes within the certificate holder's organization are documented. Written policies, procedures, or instructions and information that are interrelated and located in different areas within the certificate holder's system must be consistent and complement each other. For the interfaces to be effectively managed, the certificate holder's system should identify and document the interfaces.

Tasks

	To meet this objective, the inspector must accomplish the following tasks:	
1.	Review the interfaces associated with the Engine Condition Monitoring program that have been identified along with the individual questions in section 1, Procedures, of this DCT.	
2.	Review the certificate holder's policies, procedures, instructions, and information to gain an understanding of the interfaces that it has documented.	

Questions

	To meet this objective, the inspector will answer the following questions:	
	Note: The design job task items (JTIs) displayed with the questions in section 1, Procedures, of this DCT identify potential interfaces (by element number) for this element.	
1.	Does the certificate holder's system properly address the interfaces that are identified along with the questions in section 1, Procedures, of this DCT?	<input type="checkbox"/> Yes <input type="checkbox"/> No, Explain
2.	Does the certificate holder document a method for assessing the impact of any changes to the associated interfaces within the Engine Condition Monitoring program?	<input type="checkbox"/> Yes <input type="checkbox"/> No, Explain

SAI Section 4 - Interfaces Attribute Drop-Down Menu	
1.	No interfaces specified.
2.	The following interfaces not identified within the Certificate Holder's manual system:
3.	Interfaces listed are inaccurate.
4.	Specific location of interfaces not identified within the manual system.
5.	Other

SAI Section 5 - Management Responsibility & Authority Attributes

Objective: The questions in this section of the DCT address the responsibility and authority of the process. They are designed to assist the inspector in determining if there is a clearly identifiable, qualified, and knowledgeable person who is responsible for the process, is answerable for the quality of the process, and has the authority to establish and modify the process. (The person with the authority may or may not be the person with the responsibility.)

Tasks

	To meet this objective, the inspector must accomplish the following tasks:
1.	Identify the person who has overall responsibility for the Engine Condition Monitoring program.
2.	Identify the person who has overall authority for the Engine Condition Monitoring program.
3.	Review the duties and responsibilities of the person(s) documented in the certificate holder's manual.
4.	Review the appropriate organizational chart.

Questions

	To meet this objective, the inspector must answer the following questions:	
1.	Does the certificate holder clearly identify who is responsible for the quality of the Engine Condition Monitoring program?	<input type="checkbox"/> Yes <input type="checkbox"/> No, Explain Name/Title:
2.	Does the certificate holder clearly identify who has authority to establish and modify the policies, procedures, instructions, and information for the Engine Condition Monitoring program?	<input type="checkbox"/> Yes <input type="checkbox"/> No, Explain Name/Title:
3.	Does the certificate holder's manual include the duties and responsibilities of those who manage the work required by the Engine Condition Monitoring program? SRRs: 121.135(b)(2)	<input type="checkbox"/> Yes <input type="checkbox"/> No, Explain
4.	Does the certificate holder's manual include instructions and information for those who manage the work required by the Engine Condition Monitoring program? SRRs: 121.135(a)(1)	<input type="checkbox"/> Yes <input type="checkbox"/> No, Explain
5.	Does the certificate holder clearly and completely document the responsibility for this position?	<input type="checkbox"/> Yes <input type="checkbox"/> No, Explain
6.	Does the certificate holder clearly and completely document the authority for this position?	<input type="checkbox"/> Yes <input type="checkbox"/> No, Explain
7.	Does the certificate holder clearly and completely document its qualification standards for the person having responsibility for the Engine Condition Monitoring program?	<input type="checkbox"/> Yes <input type="checkbox"/> No, Explain
8.	Does the certificate holder clearly and completely document its qualification standards for the person having authority to establish and modify the certificate holder's policies, procedures, instructions, and information for the Engine Condition Monitoring program?	<input type="checkbox"/> Yes <input type="checkbox"/> No, Explain
9.	Does the certificate holder clearly and completely document the procedures for	<input type="checkbox"/> Yes

	delegation of authority for the Engine Condition Monitoring program?	<input type="checkbox"/> No, Explain
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SAI Section 5 - Management Responsibility & Authority Attributes Drop-Down Menu
1. Not documented.
2. Documentation unclear.
3. Documentation incomplete.
4. Other.