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| **Beskrivning av utförd granskning (att användas vid mindre förändring av underhållsprogrammet)**  |
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**M.A.302**

g) For complex motor-powered aircraft, when the AMP is based on maintenance steering group logic or on condition monitoring, the AMP shall include a reliability programme.

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| AMC M.A.302(g) Aircraft maintenance programme**RELIABILITY PROGRAMMES** | **Remarks, Comments, OK or N/A** |
| 1. Reliability programmes should be developed for aircraft maintenance programmes based upon maintenance steering group (MSG) logic or those that include condition monitored components or that do not contain overhaul time periods for all significant system components. |  |
| 2. Reliability programmes need not be developed for aircraft not considered complex motor-powered aircraft or that contain overhaul time periods for all significant aircraft system components. |  |
| 3. The purpose of a reliability programme is to ensure that the aircraft maintenance programme tasks are effective and their periodicity is adequate. |  |
| 4. The reliability programme may result in the escalation or deletion of a maintenance task, as well as the de-escalation or addition of a maintenance task |  |
| 5. A reliability programme provides an appropriate means of monitoring the effectiveness of the maintenance programme. |  |
| 6. Appendix I to AMC M.A.302 and M.B.301(d) gives further guidance. |  |

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| **6. Reliability Programmes**6.1. Applicability6.2. Applicability for CAMO/operator of small fleets of aircraft.6.3. Engineering judgement6.4. Contracted maintenance6.5. Reliability programme6.6. Pooling Arrangements. |  |  |
| **6. Reliability Programmes** |  |  |
| ***TS tillägg:**** *Om ”reliability programme” finns/krävs, beskrivs det* ***AMP*** *eller i* ***CAME 1.10****.*
* *Avsnittet beskriver ”kraven” för ett reliability programme,* ***inte*** *”hur” det ska vara uppbyggt.*
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| **6.1. Applicability** | **AMP/CAME ref.** | **Remarks, Comments, OK or N/A** |
| 6.1.1. A reliability programme **should be** developed in the following cases: |  |  |
| (a) the aircraft maintenance programme is based upon MSG-3 logic;(b) the aircraft maintenance programme includes condition monitored components;(c) the aircraft maintenance programme does not contain overhaul time periods for all significant system components;(d) when specified by the Manufacturer’s maintenance planning document or MRB. |  |  |
| 6.1.2. A reliability Programme **need not be** developed in the following cases: |  |  |
| (a) the maintenance programme is based upon the MSG-1 or 2 logic but only contains hard time or on condition items;(b) the aircraft is not a complex motor-powered aircraft according to Part-M;(c) the aircraft maintenance programme provides overhaul time periods for all significant system components;(d) Note: for the purpose of this paragraph, a significant system is a system the failure of which could hazard the aircraft safety. |  |  |
| 6.1.3. Notwithstanding paragraphs 6.1.1 and 6.1.2 above, a CAMO may however, develop its own reliability monitoring programme when it may be deemed beneficial from a maintenance planning point of view. |  |  |
| **6.2. Applicability for CAMO/operator of small fleets of aircraft.** | **AMP/CAME ref.** | **Remarks, Comments, OK or N/A** |
| 6.2.1. For the purpose of this paragraph, a small fleet of aircraft is a fleet of less than 6 aircraft of the same type. |  |  |
| 6.2.2. The requirement for a reliability programme is irrespective of the CAMO fleet size. |  |  |
| 6.2.3. Complex reliability programmes could be inappropriate for a small fleet. It is recommended that such CAMOs tailor their reliability programmes to suit the size and complexity of operation. |  |  |
| 6.2.4. One difficulty with a small fleet of aircraft consists in the amount of available data which can be processed: when this amount is too low, the calculation of alert level is very coarse. Therefore ’alert levels‘ should be used carefully. |  |  |
| 6.2.6. In order to obtain accurate reliability data, it should be recommended to pool data and analysis with one or more other CAMO(s). Paragraph 6.6 of this paragraph specifies under which conditions it is acceptable that CAMOs share reliability data. |  |  |
| 6.2.7. Notwithstanding the above there are cases where the CAMO will be unable to pool data with other CAMO, e.g. at the introduction to service of a new type. In that case the competent authority should impose additional restrictions on the MRB/MPD tasks intervals (e.g. no variations or only minor evolution are possible, and with the competent authority approval). |  |  |
| **6.3. Engineering judgement** | **AMP/CAME ref.** | **Remarks, Comments, OK or N/A** |
| 6.3.1. Engineering judgement is itself inherent to reliability programmes as no interpretation of data is possible without judgement. In approving the CAMO maintenance and reliability programmes, the competent authority is expected to ensure that the organisation which runs the programme (it may be CAMO, or an Part-145 organisation under contract) hires sufficiently qualified personnel with appropriate engineering experience and understanding of reliability concept (see AMC M.A.706). |   |   |
| 6.3.2. It follows that failure to provide appropriately qualified personnel for the reliability programme may lead the competent authority to reject the approval of the reliability programme and therefore the aircraft maintenance programme. |  |  |
| **6.4. Contracted maintenance** | **AMP/CAME ref.** | **Remarks, Comments, OK or N/A** |
| 6.4.1. Whereas M.A.302 specifies that, the aircraft maintenance programme -which includes the associated reliability programme-, should be managed and presented by the CAMO to the competent authority, the CAMO may subcontract certain functions to the maintenance organisation under contract, provided this organisation proves to have the appropriate expertise. |  |  |
| 6.4.2. These functions are: |  |  |
| (a) Developing the aircraft maintenance and reliability programmes,(b) Performing the collection and analysis of the reliability data,(c) Providing reliability reports, and(d) Proposing corrective actions to the CAMO. |  |  |
| 6.4.3. Notwithstanding the above decision to implement a corrective action (or the decision to request from the competent authority the approval to implement a corrective action) remains the CAMO prerogative and responsibility. In relation to paragraph 6.4.2(d) above, a decision not to implement a corrective action should be justified and documented. |  |  |
| 6.4.4. The arrangement between the CAMO and the maintenance organisation should be specified in the maintenance contract (see Appendix XI to AMC M.A.708(c)) and the relevant CAME, and maintenance organisation procedures. |  |  |
| **6.5. Reliability programme****In preparing the programme details, account should be taken of this paragraph. All associated procedures should be clearly defined.** | **AMP/CAME ref.** | **Remarks, Comments, OK or N/A** |
| **6.5.1. Objectives** | **AMP/CAME ref.** | **Remarks, Comments, OK or N/A** |
| 6.5.1.1. A statement should be included summarising as precisely as possible the prime objectives of the programme. To the minimum it should include the following: |  |  |
| (a) to recognise the need for corrective action,(b) to establish what corrective action is needed and,(c) to determine the effectiveness of that action. |  |  |
| 6.5.1.2. The extent of the objectives should be directly related to the scope of the programme. Its scope could vary from a component defect monitoring system for a small CAMO, to an integrated maintenance management programme for a big CAMO. The manufacturer’s maintenance planning documents may give guidance on the objectives and should be consulted in every case. |  |  |
| 6.5.1.3. In case of a MSG-3 based maintenance programme, the reliability programme should provide a monitor that all MSG-3 related tasks from the maintenance programme are effective and their periodicity is adequate. |  |  |
| **6.5.2. Identification of items.**The items controlled by the programme should be stated, e.g. by ATA Chapters. Where some items (e.g. aircraft structure, engines, APU) are controlled by separate programmes, the associated procedures (e.g. individual sampling or life development programmes, constructor’s structure sampling programmes) should be cross referenced in the programme. |  |  |
| **6.5.3. Terms and definitions.**The significant terms and definitions applicable to the Programme should be clearly identified. Terms are already defined in MSG-3, Part-145 and Part-M. |  |  |
| **6.5.4. Information sources and collection.** | **AMP/CAME ref.** | **Remarks, Comments, OK or N/A** |
| 6.5.4.1. Sources of information should be listed and procedures for the transmission of information from the sources, together with the procedure for collecting and receiving it, should be set out in detail in the CAME or MOE as appropriate. |  |  |
| 6.5.4.2. The type of information to be collected should be related to the objectives of the Programme and should be such that it enables both an overall broad based assessment of the information to be made and also allow for assessments to be made as to whether any reaction, both to trends and to individual events, is necessary. The following are examples of the normal prime sources: |  |  |
| (a) Pilots Reports.(b) Technical Logs.(c) Aircraft Maintenance Access Terminal / On-board Maintenance System readouts.(d) Maintenance Worksheets.(e) Workshop Reports.(f) Reports on Functional Checks.(g) Reports on Special Inspections.(h) Stores Issues/Reports.(i) Air Safety Reports.(j) Reports on Technical Delays and Incidents.(k) Other sources: ETOPS, RVSM, CAT II/III. |  |  |
| 6.5.4.3. In addition to the normal primary sources of information, due account should be taken of continuing airworthiness and safety information promulgated under Part -21 or Part 21 Light. |  |  |
| **6.5.5. Display of information.**Collected information may be displayed graphically or in a tabular format or a combination of both. The rules governing any separation or discarding of information prior to incorporation into these formats should be stated. The format should be such that the identification of trends, specific highlights and related events would be readily apparent. |   |   |
| 6.5.5.1. The above display of information should include provisions for ‘nil returns’ to aid the examination of the total information. |  |  |
| 6.5.5.2. Where ‘standards’ or ‘alert levels’ are included in the programme, the display of information should be oriented accordingly. |  |  |
| **6.5.6. Examination, analysis and interpretation of the information.**The method employed for examining, analysing and interpreting the programme information should be explained. |  |  |
| 6.5.6.1. Examination.Methods of examination of information may be varied according to the content and quantity of information of individual programmes. These can range from examination of the initial indication of performance variations to formalised detailed procedures at specific periods, and the methods should be fully described in the programme documentation. |  |  |
| 6.5.6.2. Analysis and Interpretation.The procedures for analysis and interpretation of information should be such as to enable the performance of the items controlled by the programme to be measured; they should also facilitate recognition, diagnosis and recording of significant problems. The whole process should be such as to enable a critical assessment to be made of the effectiveness of the programme as a total activity. Such a process may involve: |  |  |
| (a) Comparisons of operational reliability with established or allocated standards (in the initial period these could be obtained from in-service experience of similar equipment of aircraft types).(b) Analysis and interpretation of trends.(c) The evaluation of repetitive defects.(d) Confidence testing of expected and achieved results.(e) Studies of life-bands and survival characteristics.(f) Reliability predictions.(g) Other methods of assessment. |  |  |
| 6.5.6.3. The range and depth of engineering analysis and interpretation should be related to the particular programme and to the facilities available. The following, at least, should be taken into account: |  |  |
| (a) Flight defects and reductions in operational reliability.(b) Defects occurring on-line and at main base.(c) Deterioration observed during routine maintenance.(d) Workshop and overhaul facility findings.(e) Modification evaluations.(f) Sampling programmes.(g) The adequacy of maintenance equipment and publications.(h) The effectiveness of maintenance procedures.(i) Staff training.(j) Service bulletins, technical instructions, etc. |  |  |
| 6.5.6.4. Where the CAMO relies upon contracted maintenance and/or overhaul facilities as an information input to the programme, the arrangements for availability and continuity of such information should be established and details should be included. |  |  |
| **6.5.7. Corrective Actions.** | **AMP/CAME ref.** | **Remarks, Comments, OK or N/A** |
| 6.5.7.1. The procedures and time scales both for implementing corrective actions and for monitoring the effects of corrective actions should be fully described. Corrective actions shall correct any reduction in reliability revealed by the programme and could take the form of: |  |  |
| (a) Changes to maintenance, operational procedures or techniques.(b) Maintenance changes involving inspection frequency and content, function checks, overhaul requirements and time limits, which will require amendment of the scheduled maintenance periods or tasks in the approved maintenance programme. This may include escalation or de-escalation of tasks, addition, modification or deletion of tasks.(c) Amendments to approved manuals (e.g. maintenance manual, crew manual).(d) Initiation of modifications.(e) Special inspections of fleet campaigns.(f) Spares provisioning.(g) Staff training.(h) Manpower and equipment planning.**Note**: Some of the above corrective actions may need the competent authority’s approval before implementation. |  |  |
| 6.5.7.2. The procedures for effecting changes to the maintenance programme should be described, and the associated documentation should include a planned completion date for each corrective action, where applicable. |  |  |
| **6.5.8. Organisational Responsibilities.**The organisational structure and the department responsible for the administration of the programme should be stated. The chains of responsibility for individuals and departments (Engineering, Production, Quality, Operations etc.) in respect of the programme, together with the information and functions of any programme control committees (reliability group), should be defined. Participation of the competent authority should be stated. This information should be contained in the CAME as appropriate. |  |  |
| **6.5.9. Presentation of information to the competent authority.**The following information should be submitted to the competent authority for approval as part of the reliability programme: |  |  |
| (a) The format and content of routine reports.(b) The time scales for the production of reports together with their distribution.(c) The format and content of reports supporting request for increases in periods between maintenance (escalation) and for amendments to the approved maintenance programme. These reports should contain sufficient detailed information to enable the competent authority to make its own evaluation where necessary. |  |  |
| **6.5.10. Evaluation and review.**Each programme should describe the procedures and individual responsibilities in respect of continuous monitoring of the effectiveness of the programme as a whole. The time periods and the procedures for both routine and non-routine reviews of maintenance control should be detailed (progressive, monthly, quarterly, or annual reviews, procedures following reliability ‘standards’ or ‘alert levels’ being exceeded, etc.). |  |  |
| 6.5.10.1. Each Programme should contain procedures for monitoring and, as necessary, revising the reliability ‘standards’ or ‘alert levels’. The organisational responsibilities for monitoring and revising the ‘standards’ should be specified together with associated time scales. |  |  |
| 6.5.10.2. Although not exclusive, the following list gives guidance on the criteria to be taken into account during the review. |  |  |
| (a) Utilisation (high/low/seasonal).(b) Fleet commonality.(c) Alert Level adjustment criteria.(d) Adequacy of data.(e) Reliability procedure audit.(f) Staff training.(g) Operational and maintenance procedures. |  |  |
| **6.5.11. Approval of maintenance programme amendment**The competent authority may authorise the CAMO to implement in the maintenance programme changes arising from the reliability programme results prior to their formal approval by the authority when satisfied that; |  |  |
| (a) the Reliability Programme monitors the content of the Maintenance Programme in a comprehensive manner, and(b) the procedures associated with the functioning of the ‘Reliability Group’ provide the assurance that appropriate control is exercised by the CAMO over the internal validation of such changes. |  |  |
| **6.6. Pooling Arrangements.** | **AMP/CAME ref.** | **Remarks, Comments, OK or N/A** |
| 6.6.1. In some cases, in order that sufficient data may be analysed it may be desirable to ‘pool’ data: i.e. collate data from a number of CAMOs of the same type of aircraft. For the analysis to be valid, the aircraft concerned, mode of operation, and maintenance procedures applied should be substantially the same: variations in utilisation between two CAMOs may, more than anything, fundamentally corrupt the analysis. Although not exhaustive, the following list gives guidance on the primary factors which need to be taken into account. |  |  |
| (a) Certification factors, such as: aircraft TCDS compliance (variant)/modification status, including SB compliance.(b) Operational Factors, such as: operational environment/utilisation, e.g. low/high/seasonal, etc./respective fleet size operating rules applicable (e.g. ETOPS/RVSM/All Weather etc.)/operating procedures/MEL and MEL utilisation.(c) Maintenance factors, such as: aircraft age maintenance procedures; maintenance standards applicable; lubrication procedures and programme; MPD revision or escalation applied or maintenance programme applicable |  |  |
| 6.6.2. Although it may not be necessary for all of the foregoing to be completely common, it is necessary for a substantial amount of commonality to prevail. Decision should be taken by the competent authority on a case by case basis. |  |  |
| 6.6.3. In case of a short term lease agreement (less than 6 month) more flexibility against the para 6.6.1 criteria may be granted by the competent authority, so as to allow the owner/CAMO to operate the aircraft under the same programme during the lease agreement effectivity. |  |  |
| 6.6.4. Changes by any one of the CAMO to the above, requires assessment in order that the pooling benefits can be maintained. Where a CAMO wishes to pool data in this way, the approval of the competent authority should be sought prior to any formal agreement being signed between CAMOs. |  |  |
| 6.6.5. Whereas this paragraph 6.6 is intended to address the pooling of data directly between CAMOs, it is acceptable that the CAMO participates in a reliability programme managed by the aircraft manufacturer, when the competent authority is satisfied that the manufacturer manages a reliability programme which complies with the intent of this paragraph. |  |  |