EASA

TERMS OF REFERENCE

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Reference documents:	NPA corresponding to task 20.005 Ageing aircraft structures

1.Subject:

Development of an ageing aircraft structure plan

2.Problem / Statement of issue and justification; reason for regulatory evolution (regulatory tasks):

Several accidents have shown the need to develop a structural ageing aircraft programme.
Many Transport Category aeroplanes were originally certificated according to requirements that allowed continued operation, often for an indefinite period, without adequate provisions to ensure safe operation throughout the aeroplane's life. Nonetheless, continued safe operation of these aeroplanes is possible, providing their structural integrity is maintained by an effective inspection and corrective maintenance programme proven to be valid for a defined period of operation. The programme may be adjusted to reflect real time operational experience and analytical findings through the use of modern tools of analysis and testing. Maintenance programmes must ensure that aeroplane structure continues to meet appropriate ultimate strength, fatigue, fail safe and damage tolerance requirements.

To achieve this, in August 1988 the Air Transport Association of America (ATA) and the Aerospace Industries Association of America (AIA) presented the FAA with a proposal to form the Ageing Aircraft Task Force (AATF), an international group comprised of technically qualified individuals representing the airlines and aeroplanes manufacturing industry, to direct several ageing aeroplanes initiatives, results of which were to be incorporated in operators' structural maintenance programmes of the "AATF eleven" aeroplanes. In 1992 this group became the Airworthiness Assurance Working Group (AAWG), and was chartered under the auspices of the Aviation Rulemaking Advisory Committee (ARAC). This group is composed of representatives from aeroplanes operators, aeroplane TCHs and Civil Airworthiness Authorities.

Subsequently, the investigations of the AAWG and the associated task groups developed into programmes covering general guidelines for structural maintenance programmes and the following 5 key structural issues:

1) Review and update the Supplemental Structural Inspection Programme for effectiveness
2) Review existing corrosion prevention programmes and develop a baseline Corrosion Prevention/ Control Programme to maintain corrosion to an acceptable level
3) Review all structurally related Service Actions/ Bulletins and determine which require mandatory terminating action or enforcement of special repetitive inspections
4) Develop guidelines to assess the damage tolerance of existing structural repairs, which may have been designed without using damage tolerance criteria. Damage tolerance methodology needs to be applied to future repairs
5) Evaluate individual aeroplanes design regarding the susceptibility to Widespread Fatigue Damage and develop a programme for corrective action

Various Airworthiness Authorities have issued a mixture of Airworthiness Directives and Operational

Rules with supporting Advisory Material to mandate actions addressing the above issues on a variety of aeroplane types.

Studies of fleet ages in the USA indicate that several aeroplane types have ageing related problems and are reaching the point where Widespread Fatigue Damage could occur and such events have been detected in several fleets since the 1988 Aloha accident.

NPA 05/2006 corresponding to task 20.005 proposes technical guidance for the above issues but will not mandate them. It is therefore necessary to review if and how such actions should be mandated.

Aircraft other than large aeroplanes.

The above work only addressed large aeroplanes. However the issue is more general and some authorities have issued ADs for small aeroplanes (e.g. Additional Airworthiness Directive from UK-CAA on several light aircraft, Regulatory framework; CASA Australia). The scope of ageing aircraft issues should be defined by developing a regulatory Impact assessment.

It should be noted that there was an ARAC group (Small Transport and Commuter Airworthiness Assurance Working Group) that produced three reports relative to aging structure issues for small transports and commuter.

The FAA has recently held a general aviation summit (March 2006) that was devoted to general aviation aircraft aging issues.

Finally the NTSB following the accident that occurred on December 19, 2005 to the Grumman G-73T Turbo-mallard operated by Flying Boat inc, has produced the following safety recommendation:
Require records reviews, aging airplane inspections, and supplemental inspections for all airplanes operated under 14 *Code of Federal Regulations* (CFR) Part 121, all U.S.-registered airplanes operated under 14 CFR Part 129, and all airplanes used in scheduled operations under 14 CFR Part 135. This would include those airplanes operated under Part 135 that carry nine or fewer passengers and those that are operated in scheduled cargo service. (A-06-52)

Other authorities activities:

FAA has recently published a NPRM relative to widespread fatigue damage and

Transport Canada has set-up the Ageing Aeroplane Rulemaking and Harmonization Initiatives

Group as part of its CARAC (Canadian Aviation Rulemaking Advisory Committee)

An active coordination process is in place between EASA, FAA, Transport Canada and the Brazilian Authority (ANAC).

Rulemaking framework:
The rulemaking framework for such issues is somewhat complex because they need to address generally speaking the following items:

- Amendment to certification specifications to improve the standards for ageing aircraft issues. This will address the case of future TC and future amendments to TC/ future STC in accordance with the changed product rule.
- Requirements on existing design approval holders (e.g. TC, STC holders) to review their existing designs to show compliance with the amended certification specification
- Requirements on operators to introduce modifications in individual aircraft and maintenance programmes resulting from the design review.

Attachment 1 outline the rulemaking framework proposed in the EASA context.

The tasks of the group will not be to define this framework but more to develop the technical elements to be incorporated in the framework (e.g. proposals for CS modifications, proposals for mandatory actions or not, implementation dates, affected aircraft and operations)

3.Objective:

Develop the technical elements for an ageing aircraft structure plan. (e.g. proposal for mandatory actions or not, implementation dates, affected aircraft and operations, proposals for CS modifications)

4. Specific tasks and interface issues (Deliverables):

Task 1: Large aeroplanes:

- Develop the technical elements for a plan:
- Review the 5 ageing aircraft issues above and identify options for implementation to both the existing and future fleet. Consideration should be given to both mandatory and non-mandatory actions and to which aircraft and operations these actions would be applicable. The group should start by establishing the state of play on these issues (e.g. actions already taken by manufacturers).
- Select options and justify proposed actions through development of a Regulatory Impact Assessment.
- For issues deemed to be mandatory, develop the following points, based on the technical work and recommendations previously established:
    - The actions needed to be accomplished by the TC/STC holder and operators and the time scales necessary for compliance
    - Rule and AMC material for incorporation into maintenance requirements
    - New standards to be included in the CSs as necessary.

Task 2: Other aircraft :

- Develop a Regulatory Impact Assessment (RIA) for identifying the need to go beyond large aeroplanes
- Based on the results of the RIA, develop comparable technical elements for a plan in a comparable manner as for task 1.
- Review and develop AMC 20-11, to reflect its wider applicability, as necessary

Task 3: Change of Operational Use: this is not strictly only an ageing aircraft issue, but is related.

- Amend xx.1529 to add a requirement on the TCH to publish key assumptions used in the structural analysis.
- Propose compatible changes to Part M as necessary to ensure operators observe these assumptions.

Task 1 and 2 may be run in parallel

The intention for task 1 is not to develop new technical guidance and methodologies but to fully utilise the material proposed by the NPA corresponding to task 20.005 (AMC 20-20). Adaptations are nevertheless possible, in particular taking into account further developments supported by AAWG on repair evaluation and WFD methodology.

The group will maintain appropriate coordination with the group developing task 21.039.

The group will remain informed of the activities of other authorities.

The group will take into consideration compliance dates for other ageing aircraft issues in its deliberations

5. Working Methods (in addition to the applicable EASA procedures)**:**

The work shall be carried out by a rulemaking group.

The initial meeting should be held early enough so as to allow meeting the task within the required timescale. June 2007 is envisaged as this stage.

Meetings shall be held at the Agency in Cologne.

The group will be chaired by the Agency

6. Time scale, milestones:

Start June 2007.

Concept to be developed by 3 quarter 2007

Needed NPA for task 1to be developed by 4 quarter 2007; NPA for task 2 to be developed by: 2 quarter 2008; NPA for task 3 to be developed by: 4 quarter 2007

Decision/ opinion to be available by : task 1: 2 quarter 2008, task 2: 2 quarter 2009; task 3: 4 quarter 2008

Outline of the EASA rulemaking framework for Aging aircraft issues.

- **Amendment to certification specifications to improve the standards for aging aircraft issues:**
  - **This is already addressed by our existing framework**

- **Design Approval Holder rules and incorporation of new systems in production aircraft and possibly in aircraft in service:**
  - **Long term: included in the proposed revision of 1592/2002 to extend EASA scope**
    - Proposed revision to article 5 would include in the TC: Syllabus for Maintenance certifying staff type rating, syllabus of pilot type rating, MMEL, additional airworthiness specifications for a given type of operations
    - Task 21.039 of rulemaking inventory: Elaboration and adoption in the Community framework, of additional airworthiness specifications for a given type of aircraft and type of operation
    - NPA scheduled 3 quarter 2007

- **Design Approval Holder rules:**
  - **In the meantime:**
    - Use of letters or Airworthiness Directives to request 'reviews' by Design Approval Holders.

- **Maintenance rules:**
  - **General: Shared responsibility**
    - In the EU system, the responsibility is shared between the operators, the maintenance organisations and the design organisations.
    - The safeguards are already built into the European structure and it is not planned to redistribute the responsibilities.
  - **Maintenance programmes**
    - Part-M M.A.302 requires maintenance programmes to be based on data produced by TC holders, STC holders or organisations required to by Part-21.
    - Anything else requires the approval by the competent authority. In the case of ALIs this is EASA.
  - **Maintenance Data**
    - Part-145 145.A.45 requires AMOs to hold and use current maintenance data.
    - The maintenance instructions can only be modified with the approval of the competent authority.
  - **Maintenance Training**
    - Part-145 145.A.30(e) and Part-M M.A.706 require personnel to be competent and this competence to be evaluated in view of their tasks.
    - This is part of the organisation's expositions that is approved by the competent authority.
  - **Control of aircraft configuration**
    - Part-M M.A.301 requires operators to control the configuration of their aircraft and to have an embodiment policy for non mandatory modifications and for repairs
    - Furthermore, M.A.304 requires modifications and repairs to be accomplished in compliance with Part-21. The resulting maintenance data will then become maintenance data that needs approval to be changed.
  - **Maintenance rules: conclusion**
    - **There is no need to create new operational rules like in the US.**
    - **Development of AMC should be enough.**