



European Aviation Safety Agency — Rulemaking Directorate

Comment-Response Document 2011-15

Recommended practice for TBO extension

CRD TO NPA 2011-15 — RMT.0239 (MDM.038) — 20/09/2013

Related Decision 2013/025/R

EXECUTIVE SUMMARY

This Comment-Response Document (CRD) contains the comments received on NPA 2011-15 (published on 15 September 2011) and the responses, or a summary thereof, provided thereto by the Agency.

NPA 2011-15, as foreseen in the terms of reference, proposed a harmonised approach to extend, the time between overhauls of components installed in non-complex piston engine aircraft or non-powered aircraft beyond the manufacturers recommended values.

The approach proposed in the NPA, while similarly applied in certain Member States, was not in place in all Member States. The outcome of this rulemaking activity would allow a harmonised approach in all Member States in respect of the extension of TBOs, based on a previous inspection results of the component. This proposal differentiates the applicable criteria based on the aircraft utilisation.

140 comments were collected during the NPA consultation and are individually answered within this document and summarised in chapter 2 of this document. After the Agency has assessed the comments, no major changes have been introduced in the resulting text amending the AMC of Part-M.

Based on the comments and responses, Decision 2013/025/R was developed and published simultaneously with this CRD, as allowed by the rulemaking procedure adopted by the Agency's Management Board on 13 March 2012.

Applicability		Process map	
Affected regulations and decisions:	AMC to Part-M, contained in ED Decision No 2003/19/RM	Concept Paper:	No
Affected stakeholders:	<ul style="list-style-type: none">Manufacturers: TC (and STC) holdersOperators/owners of piston engine aircraftCAMO'sMaintenance organisationsAuthorities/Regulatory Bodies	Publication of ToR:	24/06/2009
Driver/origin:	Level playing field	Rulemaking group:	No
Reference:	N/A	RIA type:	N/A
		Technical consultation during NPA drafting:	Yes
		Publication date of the NPA:	15/SEP/2011
		Duration of NPA consultation:	3 months
		Review group:	No
		Focused consultation:	No
		Publication date of the Decision:	In parallel with this CRD

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1. Procedural information

1.1. The rule development procedure

The European Aviation Safety Agency (hereinafter referred to as the 'Agency') developed this Comment-Response Document (CRD) in line with Regulation (EC) No 216/2008¹ (hereinafter referred to as the 'Basic Regulation') and the Rulemaking Procedure².

This rulemaking activity is included in the Agency's Rulemaking Programme under RMT.0239 (MDM.038). The scope and timescale of the task were defined in the related Terms of Reference (see process map on the title page).

The draft AMC contained in the NPA was developed by the Agency. All interested parties were consulted through NPA 2011-15³, which was published on 15 September 2011. 140 comments were received from interested parties, including industry, national aviation authorities, individuals/associations.

The text of this Decision including the comment-response document (CRD) has been developed by the Agency.

The process map on the title page contains the major milestones of this rulemaking activity.

1.2. The structure of this CRD and related documents

This CRD provides a summary of comments and responses as well as the full set of individual comments and responses thereto received to NPA 2011-15. The resulting AMC text is provided in Chapter 3 of this CRD.

1.3. The next steps in the procedure

The Decision containing AMC to Part-M is published by the Agency together with this CRD.

¹ Regulation (EC) No 216/2008 of the European Parliament and the Council of 20 February 2008 on common rules in the field of civil aviation and establishing a European Aviation Safety Agency, and repealing Council Directive 91/670/EEC, Regulation (EC) No 1592/2002 and Directive 2004/36/EC (OJ L 79, 19.3.2008, p. 1), as last amended by Commission Regulation (EU) No 6/2013 of 8 January 2013 (OJ L 4, 9.1.2013, p. 34).

² The Agency is bound to follow a structured rulemaking process as required by Article 52(1) of the Basic Regulation. Such process has been adopted by the Agency's Management Board and is referred to as the 'Rulemaking Procedure'. See Management Board Decision concerning the procedure to be applied by the Agency for the issuing of Opinions, Certification Specifications and Guidance Material (Rulemaking Procedure), EASA MB Decision No. 01-2012 of 13 March 2012.

³ See: <http://easa.europa.eu/rulemaking/docs/npa/2011/NPA%202011-15.pdf>.

2. Summary of comments and responses

The purpose of the Notice of Proposed Amendment (NPA) 2011-15, dated 15 September 2011, was to propose an amendment to Decision 2003/19/RM of the Executive Director of the European Aviation Safety Agency of 28 November 2003⁴. The scope of this rulemaking activity is outlined in Terms of Reference (ToR) RMT.0239 (MDM.038) published on 24 June 2009 and is described in more detail below.

The overhaul of some of the components is a maintenance activity which ensures the continuing airworthiness of an aircraft. These overhauls are not performed often but, due to the amount of work and sometimes the new parts required to be fitted, they are costly. Since the overhaul of components (e.g. overhaul of a piston engine), is not an airworthiness limitation, it is possible to consider its extension beyond the time recommended by the manufacturer. The time between overhauls (TBO) recommended by the manufacturer may be typically based on calendar time or flight hours/cycles. Postponing the time to perform an overhaul does not necessarily reduce the overall operating costs of the aircraft, since it may be cheaper to maintain the component overhauled depending for instance on aircraft utilisation, but this is an economical aspect that the aircraft owner will have to assess. Experience in certain countries has shown that, certain components installed on an aircraft may be safely operated beyond the values recommended for overhaul by the manufacturer.

The Agency is facing a situation where the EASA Member State competent authorities have different policies and different procedures to control the TBO extension of the components installed on aircraft on their register. In some of the countries, the competent authority permits that the component's overhaul is not performed when recommended by the manufacturer's instructions, and a request was addressed to the Agency to launch a task to issue means to harmonise this process in 'EASA Member States'.

The NPA 2011-15, based mainly on the experience of some Member States, proposed certain criteria to assess the condition of a component that has reached its recommended time for overhaul and, in case of a positive assessment of its condition, the process to amend the maintenance programme with the new overhaul time.

During the consultation period the Part-M General Aviation Task Force (Phase I)' was issued and it is proposing some alleviation to ELA1 and in some cases ELA2 aircraft. It also introduces the Minimum Inspection Programme for ELA1 aeroplanes not involved in commercial operations, which is to be performed every annual/100 FH interval, together with the possibility of establishing the self-declared maintenance programme that provides further relief from DAH prescribed maintenance requirements. The two NPAs supplement each other because they cover different aircraft with different types of operation and MTOWs.

In total, 140 comments were received during the consultation of the NPA. The comments were made by 43 users on 10 segments on this NPA. These 140 comments were responded as follows: 8 - accepted, 22 - partially accepted, 72 - noted, 38 - not accepted.

⁴ Decision No 2003/19/RM of the Executive Director of the Agency of 28 November 2003 on acceptable means of compliance and guidance material to Commission Regulation (EC) No 2042/2003 of 20 November 2003 on the continuing airworthiness of aircraft and aeronautical products, parts and appliances, and on the approval of organisations and personnel involved in these tasks. Decision as last amended by Decision 2013/005/R of the Executive Director of the Agency of 21 March 2013.

The distribution of the comments per NPA sectors is the following:

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The comments are answered individually in chapter 4 of this document. Below follows a summary of the comments received:

- 11 comments received were proposing to increase the extension of the time between overhauls (e.g. from 20 %, proposed in the NPA to 30 %). The proposal was declined based on the fact that the experience in most of the Member States has shown that the time between overhauls is extended to a maximum of 20 %.
- Some comments (18) were requesting to allow the TBO extension for aircraft performing towing operations. The Agency has changed the proposed text to accommodate the overhaul of components installed in aircraft used for that operation: while a component, such as the engine, may be operated under more demanding conditions, it can be reasoned that the inspection required to assess the engine conditions, will determine if the overhaul of the engine can be extended. Compensating measures are introduced such as additional inspections. Nevertheless, the limitation on the aerobatic flights is maintained because when such flights are conducted regularly, for instance, the engine is undergoing through hard loads. The constant alternating high/low power settings, accelerations/decelerations, momentary overspeeds, oil pressure fluctuations (even with an inverted oil system) and the nature of aerobatic flights (tend to be short trips, hence many cycles) take a significant wear to engine's parts. Most of the engines are not operated until the TBO, they are sent to overhaul earlier.
- 22 comments addressed the exclusion of training activities from the TBO extension process. The resulting text has been changed in order to provide the possibility to extend the TBO of components installed on aircraft used for training except for ab initio training. During ab initio training a student flying solo has to be protected from any potential situation where any component may not function as intended, even taking in account that the probability is very remote.
- The NPA proposed that, instead of performing an overhaul at a given time, the component condition would be ensured by regularly monitoring as from the first day of utilisation. 10 comments addressed this concept, mainly proposing that the approach for the condition monitoring of the components could be adopted at a later stage of the component's life. The resulting text was changed to provide the possibility of establishing the condition monitoring programme for the components at a later stage as long as it would accumulate 6 consecutive checks of the condition of the component, before using the concept to determine trends.
- 11 comments related to the limitation for components TBO extension applicable to CAT aircraft. No changes were introduced concerning this limitation based on the average approach currently followed by the Member States permitting this practice.
- 5 comments were related to the limitation for components' TBO extension for aircraft flying under Instrument Flight Rating (IFR). No changes were introduced concerning this limitation

but an explanation was given in the responses to these comments to clarify that only the IFR related components are subject to this measure.

- 4 comments were posted on the removal of MTOW limitation, the changes were not introduced based on the common approach currently followed by the Member States permitting this practice.
- Some commentators, mainly engine TC holders or maintenance organisations, gave arguments to not extend the TBO beyond the times recommended by the TC holders. The arguments included both, economic considerations and considerations based on experience gathered in respect to the component condition (e.g. wear, corrosion) found during its overhaul at the recommended TBO. These comments have led to no changes, because there is no direct dependence from the performance of overhaul and increased reliability of the component. The assessment of the advantage of a TBO extension from an economic perspective is left to the aircraft owner. The component condition will have to be assessed during the inspection required prior to the TBO extension. Although the inspections will not provide the same level of detail on the component's condition as an overhaul, this approach has proven safe in the countries extending the TBO beyond the times recommended by the manufacturers.
- Some other comments requested that the Agency should develop, similarly to the case of piston engines, some guidelines that could be used to inspect propellers to assess their condition before extending the TBO. The Agency has decided not to include these guidelines since within 'the references studied' for this purpose, such as GR No. 17 Maintenance Requirements for Variable Pitch Propellers installed on Aircraft Holding a UK Certificate of Airworthiness and guidance from the Austrocontrol Airworthiness Notice No. 43A Maintenance programme for aircraft which are not used in commercial operations, no common approach has been found, and recommending a particular method as preferred, would not have been justified and could be misleading.

In addition to changes described above three editorial changes are introduced.

The following is a summary of the remaining changes to the text proposed with the NPA:

- In order to harmonise as much as possible the EASA documents, some layout and structure issues were changed. Also the title of the of the AMC2 M.A.302 (d) and the title of the rulemaking task were changed. All references made in this Explanatory Note are provided in accordance with an structure of original NPA text published on 15 September 2011.
- Provision 2(a) of the AMC#2 M.A.302(d) was changed to clarify the possibility of performing the components' TBO extension by the certifying staff, which is entitled to perform the overhaul depending on the component and the category of the aircraft and to exclude the possibility of performance of TBO extension by A-rated maintenance organisations.
- Provision 2(c) of the AMC#2 M.A.302(d) was changed to clarify the additional requirements related to the maintenance programme.
- Provision 2(d) of the AMC#2 M.A.302(d) was changed to clarify the inspection criteria for part's components.
- Provision 2(j) of the AMC#2 M.A.302(d) was changed to clarify the possibility of the indirect approval of the aircraft maintenance programme.
- Provision 3(a) of the AMC#2 M.A.302(d) was changed to allow the TBO extension for the aircraft operated in highly corrosive environment and used for towing while adding the additional safeguards in the form of supplemental inspections.
- AMC#2 M.A.302(d)(4) was changed to introduce the possibility of implementing an on-condition monitoring maintenance programme for components that are already in service.
- GM M.B.301(c) was changed to AMC M.B.301 (b) to provide for the competent authorities the option to reject the approval of the TBO extension if there is not enough operating experience for the component/aircraft concerned.

- Item 2.2 of Appendix XIV to AMC#2 M.A.302(d) was changed to give the possibility to competent authorities to consider alternative types of inspections and checks.
- Item 4.1.1 of Appendix XIV to AMC#2 M.A.302(d) was changed to add the reference to UK CAA guidance for correction factors used for the engine power checks.

3. Individual comments (and responses)

In responding to comments, a standard terminology has been applied to attest the Agency's position. This terminology is as follows:

- **Accepted** — The Agency agrees with the comment and any proposed amendment is wholly transferred to the revised text.
- **Partially accepted** — The Agency either agrees partially with the comment, or agrees with it but the proposed amendment is only partially transferred to the revised text.
- **Noted** — The Agency acknowledges the comment but no change to the existing text is considered necessary.
- **Not accepted** — The comment or proposed amendment is not shared by the Agency.

3.1. Table of comments and responses

(General Comments)	-
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comment	37	comment by: <i>Cessna Aircraft Company</i>
	Cessna Aircraft Company has no comment on this issue at this time.	
response	<i>Noted</i>	
comment	39	comment by: <i>René Meier, Europe Air Sports</i>
	Europe Air Sports, on behalf of its members, wishes to thank the Agency for this initiative highly welcomed by the European sports and recreational aviation community. We wholeheartedly support many of your proposal as we recognise a significant potential of cost decrease due to extended TBO's and reduced replacement of parts. We still firmly believe in the "on condition"-based maintenance of aircraft with a CMTOM < 2730 kg.	
response	<i>Noted</i>	
	Item 4 of AMC#2 M.A.302(d) – Time Between Overhauls gives a possibility to apply complete condition monitoring maintenance programme for components, instead of TBO, subject to certain conditions and approval by the competent authority and it is applicable to non-powered and piston engine aircraft other than complex motor-powered aircraft that are not subject to CAT, IFR flights and depending on utilisation/typical environment.	
comment	47	comment by: <i>René Meier, Europe Air Sports</i>
	We support the initiative of the Agency, we think, however, that in many cases the urgently needed and in the past repeatedly asked for level playing field will not be created by the freedom of action and judgment given to the competent authorities because of the fact that the following of different approaches will persist.	
response	<i>Noted</i>	
comment	83	comment by: <i>Light Aircraft Association UK</i>

response	The LAA broadly supports the concept of on-condition assessment of lifed items, as described in this NPA.	<i>Noted</i>
comment	<p>93</p> <p style="text-align: right;">comment by: UK CAA</p> <p>Page No: General Paragraph No: General Comment: It is not clear whether this proposal covers those engines which have a recommended replacement life as well as a recommended TBO period. EASA should consider adopting a list of engines that do not qualify for inclusion in this extension programme. Justification: Some engine types do not have OEM recommended overhaul periods and have a replacement life specified instead. It is proposed that this guidance would not cover such engines. Also, it is considered that some engine types have yet to accumulate sufficient service experience to demonstrate acceptable reliability when operating beyond the manufacturer's recommended overhaul period and adoption of such a list would allow EASA to control the extension of new types as they are introduced until sufficient experience is gained.</p>	
response	<p><i>Partially accepted</i></p> <p>In accordance with item 1 of the AMC#2 M.A.302 (d) only the recommended components' TBOs are considered. In case of the recommended replacement life this AMC is not applicable. Provision G.M. M.B.301 (c) is changed to address the problem of the components/engines not having enough operational experience.</p>	
comment	<p>94</p> <p style="text-align: right;">comment by: UK CAA</p> <p>Page No: General Paragraph No: General Comment: Reference is made to the TBO extension of component which could be interpreted as components such as engine magnetos and propellers. Taken literally these could be extended indefinitely on privately operated aircraft which is outside our experience. The UK CAA does not have a policy to indefinitely extend all components and would propose that NPA 2011-15 addresses primarily piston engine TBOs. In particular, the proposal would permit items such as variable pitch propellers on privately operated aircraft to operate indefinitely, without any explicit inspections of bare blades and hubs. The UK CAA currently has a Generic Requirement (No.17) in publication CAP 747 regarding maintenance requirements for variable pitch propellers. Justification: Industry experience of propeller overhaul periods. Proposed Text: Amend to make reference to engine TBO periods only. The EASA might consider introducing similar maintenance requirements for variable pitch propellers for which the manufacturer has not published overhaul lives in terms of hours or calendar period in order to ensure that all propeller types are maintained to an acceptable airworthy standard.</p>	
response	<p><i>Not accepted</i></p> <p>The Agency does not agree with the statement made: the proposed method for extension of the time between overhauls requires an inspection on the subject component prior to the extension. It is true that specific guidance material (GM)</p>	

has been established for the inspection of piston engines only. Based on the comments received on the NPA, the Agency assessed the opportunity to also provide GM for inspections of variable pitch propellers, but the documental material reviewed for the purpose and gathered from different sources presented differences difficult to reconcile and it was decided not to include them in GM.

comment

106

comment by: *Swedish Transport Agency, Civil Aviation Department (Transportstyrelsen, Luftfartsavdelningen)*

The general view is that we agree to propose an AMC for guidance on TBO limits. We also would like to mention that the Swedish CAA have long experience of granting extended intervals for TBO on piston engines for both privately and commercially operated aircraft. We have so far not seen any significant negative effects related to extensions of the TBO intervals.

Comments

Our further comments are based on the policy to simplify for this segment of operations, private, Aerial work and Flight training.

The proposed AMC may be simpler written with less text and therefore easier to understand.

response

Noted

comment

115

comment by: *Loma-Air*

Dear,

After review of your NPA 2011-15, "Non-binding guidance on TBO Limits", I would like to give our comments and high concerns about this proposal.

As an engine overhaul shop, with more than 30 years of experience, we are not afraid for the negative economical impact due to this NPA.

More important are our concerns for safety and we are sure that this proposal will not be a benefit to the aircraft owners at all.

Due to the following reasons:

. We overhaul about 200 engines each year.

For about 50% of these engines it's urgent to overhaul due to the wear on crankshaft bearings.

. We've overhauled engines which ran 4000 hrs. after overhaul. With all of these engines we had to grind the crankshaft and lap the crankcase.

This is a supplemental cost, but if one of these items will be rejected, than this is an economic disaster for the aircraft owner.

Where is the benefit for the owner? He will have to pay double for the overhaul.

. A lot of these aircraft owners fly with Mogas instead of Avgas.

But flying with Mogas will increase the wear on many different engine parts.

TBO must be decreased when flying with Mogas instead of ulimiting the TBO!

. Private aircraft owners fly 20 to 25 years before reaching the TBO. Following your proposal, they will still be flying after 40 to 45 years with the same engine without proper inspections of the engine.

The appendix XIV, inspection to time between overhauls, is nothing more than a 100 hrs. inspection.

We suggest that following inspections must be added to this proposal:

- Oil analyses at least once a year and this starting before 50% of the TBO is reached.

- When the engine has to be splitted after TBO is reached for any reason, for example shockload inspection, repair, etc. the engine must be overhauled.

- Replacement of cylinders should Not be allowed after engine TBO.

We had customers installing new cylinders after about 2500 hrs. With the

installation of these new cylinders, they had excellent compressions but this increased the wear on the main crankshaft bearings. So after about 100 to 200 hrs. the engine oil pressure dropped and the oil temperature increased. then the engine had to be overhauled anyway but the aircraft owner did invest in new cylinders not so long ago. Where is the benefit for the aircraft owner?

We think that this proposal gives a wrong signal towards aircraft owners.

We believe there must be a limit on the TBO! We prefer the regulations in Belgium. At this moment, the TBO is multiplied by 1.2.

This will be the new TBO, if this is reached within 12 years then there is an additional extension of 20% on the new TBO.

For example: when you have a Cessna 152 with an engine Lycoming O-235-L2C, you can fly up to 3456 hrs. within 12 years. Otherwise it will be 2880 hrs.

See reference Airworthiness Circulaire 8 from the Belgian CAA.

According to our experience this is the limit!

If you still have questions, you can reach us at below mentioned contact details.

Always at your service, I remain with Kind Regards,

Patrick Van Doren

General Manager

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response

Noted

Operation of the above mentioned aircraft with the Mogas is possible only with the approval of DAH documentation. Often this is the STC Holder. The data provided by the DAH in form of ICAs typically contains the compensating measures for such operation.

The discussed NPA is proposing guidance for the extension of recommended TBO. Of course it is an owner/operator's decision to extend the TBOs or not and it should depend on the conditions of operation including the fuel used.

In addition to that, although, most of the guidance proposed by this AMC is dedicated to the piston engine, it provides for the other components' TBO extensions as well.

comment

125

comment by: EFLEVA

The European Federation of Light Experimental and Vintage Aircraft (EFLEVA) generally welcomes the introduction of "on-condition" assessment of lifed components noted in NPA 2011-15

response

Noted

comment

126

comment by: EFLEVA

In several places there are limitations excluding complex motor-powered aircraft and aircraft with a MTOM exceeding 2730 Kg.

We see no justification for these limitations. There is no evidence that complex or heavy aircraft will present a greater risk than smaller aircraft, if an on condition approach to component life is applied. This limitation unreasonably penalises the

response	<p>larger historic aircraft. We recommend that the weight limitation and the complex motor powered aircraft exclusion be removed. Specifically with multi engine historic aircraft, which operate below their original service mass limitations, there is an additional safety margin, if a "one engine out" situation occurs. This reserve is obviously not present in the smaller single engine types.</p> <p><i>Not accepted</i></p> <p>This AMC was drafted using the guidance and approaches already implemented by some Member States' NAAs, where the existing practice is not to apply the TBO extensions for certain types of piston engine aircraft.</p> <p>The removal of the complex motor-powered aircraft limitation, as well as the MTOW limitation, would create a situation where the other limitations e.g. aircraft utilisation, operations and environment could not be justified. The 'historic' aircraft falling under criteria of Annex II are excluded from compliance with Basic Regulation.</p> <p>Also the age of old aircraft should be taken into account. The components could be affected by the time and environment deterioration conditions stipulated by the lengthy calendar terms they are exposed to.</p>
comment	<p style="text-align: right;">comment by: <i>rectimo</i></p> <p>133</p> <p>Dans le cadre de votre projet de NPA relatif à la mise en application du « On condition » sur les moteurs a pistons, nous vous informons qu'en tant que motoriste fondé aéronautique depuis 1958, ce projet n'est pas acceptable notamment du fait des raisons suivantes :</p> <ul style="list-style-type: none"> - Transfert de prérogatives des motoristes vers les ateliers de maintenance en ligne (rating A) sans réelles possibilités d'exercer sa responsabilité. - Impact économique incertain pour le consommateur final. - Augmentation du cout des pièces et des cores à brève échéance. - Procédures alternatives de contrôle incomplètes. - Sécurité incertaine voire hasardeuse. - Contexte social et réglementaire Franco Français inadapté au souhait d'harmonisation européen. - Responsabilité systématique du professionnel pourtant soumis à la pression économique de son client. - Spécificité Française de la notion juridique d'Aéroclubs (Statut de propriétaire privé). <p>Vous n'êtes pas sans savoir que l'instauration du « on condition » en Europe implique la suppression de l'obligation d'appliquer les TFAR (Temps de fonctionnement avant révision) ou dit TBO (Time Between Overhaul). Si des aménagements d'extension de TBO avaient été rendu possibles par le passé, il ne fut pas moins que tout moteur à piston se devait de subir une Révision générale à une butée fixe conformément aux recommandations techniques du constructeur.</p> <p>La philosophie de cette NPA implique la suppression des procédures recommandées par les constructeurs en les remplaçant par des procédures alternatives allégées. Tellement allégées qu'elles en finissent par ne plus assurer leur fonction première de prévention du risque. Ces procédures alternatives sont largement incomplètes et ne sont pas de nature à garantir l'entière sécurité des usagers.</p> <p>Cette position est de nature a largement remettre en cause la sécurité du parc actuel. Dès l'entrée en vigueur de cette NPA, les contrôles dimensionnelles des différents composants du groupe motopropulseur ainsi que leurs contrôles magnétoscopiques ne seront plus obligatoires a une butée fixe pourtant recommandée par le constructeur. Ils ne seront donc vraisemblablement plus effectués du tout.</p>

En tant que motoriste français de référence je vous mets lourdement en garde contre une telle décision. Elle semble de nature à gravement mettre en danger la vie d'autrui et à outrepasser le principe de précaution en vigueur en Europe.

Je vous précise que je peux largement appuyer mes dires par des statistiques fiables ainsi que sur les processus de traçabilité que l'Autorité nous impose de mettre en œuvre. Ces éléments sont non seulement probants mais ils sont également contrôlables en nos locaux par toute Autorité qui en manifesterait la volonté.

Le relevé de l'ensemble des contrôles magnétoscopiques sanctionnés par un refus car affecté par des criques ou des anomalies majeures sur des éléments situés à l'intérieur ou à la périphérie des carters est éloquent.

Inutile de vous rappeler que de telles anomalies, si elles ne sont pas détectées en temps utiles (Révision Générale conformément aux recommandations du constructeur), peuvent rapidement tourner au drame.

Nous traitons dans notre structure environ 120 moteurs par an (dont environ 50 % en production constructeur et 50 % en production RECTIMO.)

L'étude statistique effectuée par nos soins portent sur une période de 4 ans et demi sur la période 2007 à mi 2011.

Soit approximativement sur 270 moteurs traités par nos soins sur une période de 4.5 ans (2007 à mi 2011, soit 4.5 X 60 moteurs), nous avons décelé par la mise en œuvre des procédures de contrôle NDT :

- 38 anomalies critiques si non corrigées dans un délai raisonnable indétectable autrement que par la mise en œuvre de ces procédures de NDT prévues par les constructeurs. L'action corrective ne peut d'ailleurs être opérée autrement que par un atelier moteur agréé et formé pour désassembler les carters moteur.

- 2 anomalies critiques si non corrigées dans un délai raisonnable indétectable autrement que par la mise en œuvre de ces procédures de NDT prévues par les constructeurs. L'action corrective pouvant toutefois être opérée par un mécanicien de maintenance en ligne sous réserve d'avoir découvert les anomalies en question.

Cela signifie que sur approximativement 270 moteurs traités, 14,8 % d'anomalies sont identifiées grâce à cette procédure de contrôle clairement identifiée dans les procédures préconisées par les constructeurs.

En l'état actuel de votre projet, vous prévoyez la suppression des Révisions Générales qui prévoit ces mêmes contrôles. Vous ne prévoyez toutefois en aucun cas leur remplacement. Inutile de vous dire que dès l'application sur le terrain de votre projet d'instauration du « On Condition », 14,8% des moteurs seront affectés de défauts majeurs pouvant conduire à des ruptures brutales d'éléments en vol et qui à aucun moment ne pourront être détectés par quiconque.

Aucune des tâches prévues dans votre fascicule ne prétend au remplacement des contrôles NDT. En aucun cas les analyses d'huiles ne peuvent prétendre en leur remplacement. Ces dernières ne sont que des indications de tendance sans aucune valeur probante... et encore... uniquement lorsqu'elles sont effectuées lors de la mise en service du moteur... et non sur sa fin de vie tel que vous le prévoyez.

Il est absolument formel que le type d'anomalie que je viens de lister sont absolument indétectables à l'œil nu par un technicien de maintenance en ligne. Ce dernier n'ayant d'ailleurs ni les agréments, ni l'expérience pour effectuer de tels contrôles NDT ne pourra donc que libérer des moteurs sans avoir aucunement réalisé des contrôles exhaustifs sur les blocs motopropulseurs. Seules les procédures constructeurs permettent l'assurance d'une pleine navigabilité des moteurs. Or je vous rappelle que tout gestionnaire de navigabilité est soumis à une obligation de résultat. Pour exercer convenablement sa responsabilité, il ne doit à aucun moment être soumis aux pressions financières et commerciales de ses clients.

Je vous rappelle par ailleurs que le problème est absolument similaire sur les

contrôles dimensionnels mais il est toutefois plus difficile de vous faire part à brèves échéances de statistiques précises car non rentrées en base de données. Nous n'avons pour le moment pas eu loisir d'entamer de calculs statistiques chronophages. Mais croyez en notre expérience ces chiffres s'ils étaient calculables immédiatement seraient encore plus éloquentes.

Par ailleurs, Nous travaillons activement avec le BEA qui depuis quelque temps s'intéresse à l'état d'usure avancé trouvé sur les carter de O235. Les extensions de TBO accordé en 2001 (d'une recommandation constructeur de 2400 heures à une extension de 20% pour 2800 heures), n'ont eu que pour effet d'user ces moteurs « jusqu'à la corde ». La marge de sécurité généralement attendue d'un produit certifié n'est désormais plus assurée. Nombreux sont les carters atteints par des criques majeures.

Vous avez aujourd'hui connaissance du risque porté par votre projet de fascicule portant sur la suppression des TBO moteur. La mise en application d'un tel texte ne pourra que s'accompagner d'incidents majeurs, voire d'accidents mortels. Persister dans cette voie va à l'encontre autant de la réglementation française et européenne relative au principe de précaution.

Je vous rappelle par ailleurs que la réglementation américaine ne prévoit le régime de on condition que pour l'aviation privé (pilote propriétaire uniquement). Nous sommes donc ici bien loin du projet de NPA qui ouvre cette possibilité à la totalité des usagers (or formation, CTA et IFR).

Ce choix ne peut qu'être annonciateur de nombreux litiges dramatiques. Toute société commerciale (**qui offre une prestation à titre onéreuse, ce qui inclut la formation et les baptêmes dans les aéroclubs**) à le devoir d'apporter autant à son client qu'à son salarié la pleine sécurité que l'on attend d'elle. Cette obligation de sécurité passe évidemment par le respect des recommandations du constructeur. Non seulement cette obligation n'est ici plus assurée mais d'autre part il est prouvé que 14,8 % des moteurs sont affectés d'anomalies susceptibles d'entraîner des ruptures brutales d'éléments. Il est donc impensable de persister dans cette voie sans prendre en compte ces informations factuelles.

Je vous rappelle également qu'en France, le système de type Aéro club opère de la formation au travers d'association loi 1901, considéré comme non professionnel. Ce système un tantinet hypocrite permet au système français de considérer généralement la formation comme une prestation non commerciale (alors que pour autant elle reste onéreuse...). Il serait donc judicieux d'exclure de votre projet la formation (toujours effectuée à titre onéreux) de votre projet de suppression de TBO. L'élève qui paie ses cours a-t-il réellement connaissance du fait que son moteur évolue en dehors du cadre recommandé par le constructeur ? Sait-il seulement les risques qu'il encourt au regard des statistiques que j'ai porté à votre connaissance et qui sont vérifiables à votre convenance ?

Je vous sommes par conséquent de bien vouloir réfléchir à ces informations et prendre les dispositions qui s'imposent, il va de soit que vous porterez une lourde responsabilité dans les choix que vous prendrez dans la mise en application telle quelle de ce fascicule.

Restant à votre disposition, je vous prie de bien vouloir trouver ci-joint l'expression de mes sentiments les meilleurs

Fabien

DESMURS

PDG RECTIMO AVIATION

response

Noted

The proposed change to AMC is based on the practice in respect of TBOs extension existing in different European countries: the NAAs of the states where TBOs extension is a common practice, have not reported any negative effect on the aircraft safety.

Not performing the TBO at the time recommended by the OEM will not be safer

than overhauling it as recommended. Proportionate rules for different aviation sectors drive this proposal allowing the extension of the TBOs only for certain aircraft/operations.

When specific engine types would require an airworthiness limitation to prevent operation of the engine beyond the limits recommended by the engine manufacturer, this should be established by means of an Airworthiness Directive. The existing European airworthiness rules require that safety occurrences are reported to the TC holder, the NAAs and the Agency, as applicable.

comment 147

comment by: RECCHIA Giuseppe Guido

AMC#2 M.A.302(d)**General**

1) We believe that if a scenario is considered so "critical" to have the need of establishing limitations to provisions of M.A.302(c) (AMP indirect approval privilege) and M.A.302(d), those limitation should be included in section A and not in the relevant AMC.

Therefore if we want:

1. to exclude possibility of using indirect approval procedure for TBO extension not considered as airworthiness limitation we should include a specific provision in M.A.302(c) as we did for maintenance program of aircraft registered in a state different from which has approved the concerned CAMO (see M.A.302(c)(ii));
2. to limit extent of M.A.302(d)(iii), we should include a specific provision in that requirement as we did in respect of safety related tasks

However, we do not believe in any case that both above limitations should be established provided that full traceability of the activities carried out in those contexts is ensured.

2) There are no guidance/indications how to manage transition from previous policies in force in each member States into the new scenario.

Point 2 a)

It should be clarified which type of maintenance organisation is allowed to perform such inspection (i.e. appropriate C, B or A rated AMO) and also the person who can be authorised to declare the results of that inspection (it seems it should be appropriate C rated AMO for components TBO or appropriate B rated AMO for engine TBO if we consider in particular point (d) contents, and A rated AMO or M.A.801(b)2 CS when component overhaul is allowed in M.A.502).

Point 2 b)

It should be clarified if, in respect of piston engines, 1) the content of AMC#2 M.A.302(d) is applicable in its entirety or 2) only the tasks laid down in the Appendix XIV to AMC#2 are applicable. If it is confirmed that point 1 above is true, it should be considered that the point 2).d of the AMC is requiring that the engine must be disassembled in order to gain access to parts which are normally requested to be changed at TBO. We are afraid that asking to "open" so frequently a component may expose component itself to more potential problems (e.g. increasing risk of maintenance errors and accidental damages of more problems, etc) than those they intend to detect . Additionally, even though we are aware that we should decide about accepting or not extension of TBO limits only on the basis of the effect on airworthiness only and that the economics of operation of such procedure is an evaluation of the aircraft owner, we believe that costs for those activities, taking into account possible consequences in terms of costs of the issues raised in comments 2 e) and 2 g) below, may be too high in respect of the benefits obtained : in other words our position it would be equivalent to ask for complying with recommended TCH TBO limits. Has been this kind of evaluation made?

Point 2 c)

More guidance on aspects to be taken into account to define standards, conditions and criteria to be used for establishing the contents of inspection to grant TBO extension for components other than engines should be provided in order to ensure that a level playing field is reached

Point 2 e)

It should be clarified what it does mean "*the results of the inspectionshould be conclusive*" in particular in relation to point 2 g) wherever it says "*As a minimum another conclusive inspection.....*" – see also below

Point 2 g)

It should be clarified the content of the "*conclusive inspection*" to be performed reaching 50% of the extended interval. Further in case of TBO with both calendar and operating hours limits, it is not clear if, in case of positive inspection, the extension of the TBO is granted at the same time for both limits. Additionally it should be clarified if the time at which intermediate inspection must be performed is established following the same criteria as per identification of TBO**

Point 3

It is not clear what is the rationale to exclude certain type of operations from possible TBO extensions instead of other (e.g. in respect of commercial operations, why CAT and flight training environment have been excluded? Are there any specific limitations to this end established as result TC exercise for recognizing IFR capability of certain type of aircraft?, etc.) . In fact if the premises for allowing TBO extension concept as stated in the NPA are valid (...since the well cared components are often in condition for safe operation. Therefore the aircraft owners may profit to postpone its overhaul), those considerations are even more valid for commercial operations being conducted in a controlled environment. This proposed approach seems also to be possibly in conflict with M.A.302 provisions which allow operator to propose different intervals for maintenance tasks (M.A.302(d) (iii)). If the intention was instead to consider this set of conditions as a simplified procedure for non commercial operations we should clarify it and provide guidance how to manage the TBO extension in the other scenario.

On the other hands, It is not clear why apparently lack of evidence of accumulation of sufficient service experience to demonstrate acceptable reliability when operating at the manufacturer's recommended overhaul period has not been taken as basis to exclude certain engines type from extension of the relevant TBO.

Point 3 b)

This statement should be reworded taking into account above comments . It could be "*A component with an extended TBO may be installed in a different individual aircraft when:*

- 1. The aircraft are part of an operator fleet for which the same approved AMP applies;*
- 2. The aircraft can be considered as a part of a common fleet (i.e. are maintained in compliance with approved maintenance program which is based on the same documents and same premises in terms of estimated annual utilization, typical operational environments, same aircraft configuration, same procedures for management of the approved AMP in term of periodic review, policy on adoption of non-mandatory TCH ICA, same operational environment and pilot qualification criteria, etc.)*
- 3. (other situations, if any....."*

Guidance Material GM M.B.301(c)

We believe that such guidance material is against the establishment of a level playing field. Why not trying to establish basis for co-operation among authorities, including EASA, in order to allow CAMO and/or operator to exploit its own expertise and capabilities instead of penalizing them because of lack of expertise in some authority. In addition point 2 of the GM seems to be contradictory unless it implies that NAA entirely prohibits the extension of TBO for their registered

aircraft: if the authority feels itself not having enough expertise (we believe this is relevant to knowledge of specific components) it should decide not to allow at all the TBO extensions instead only to limit indirect approval privilege once it has been recognized: as written it seems that CAMO which has the relevant capability may only propose to the NAA only the approval of the extension of the TBO even though NAA does not have expertise)

Appendix XIV to AMC#2 M.A.302(d)

In this appendix rubber parts ageing and corrosion phenomena seem not to be taken into account. Specific inspections like boroscope of cylinder barrel or of other cylinder areas, inspections for corrosion of accessory gears in the accessory gear box, determination of exhaust valve and guide condition, etc. should be considered

response *Partially accepted*

AMC#2 M.A.302(d) General The M.A.302(d) item (iii) contains the general provisions for such cases already, the application of which might be quite different and could be the de-escalation as well.

The provisions of said M.A.302(d)(iii) and AMC M.A.302(d)(7) are, however, found to have enough precautions for not allowing to extend the TBOs under the indirect MP approval procedure.

The possibility of having indirect procedures for extending TBOs is re-introduced with changed provisions.

The most challenging will be the situation where TBO extensions for any reason are not falling within the scope of the Decision, e.g. type of operation, utilisation, MTOW or number of the extensions. This AMC is establishing the minimum standards and NAAs, based on their experience, will have to address each aircraft with extended TBO individually.

Point 2 a) Please refer to response to comment No 8.

Point 2 b) Item 2(d) of the AMC#2 M.A.302(d) is referring to components other than engines, because in accordance with item (b) the engine inspection should satisfy the requirements of the Appendix XIV of the above mentioned AMC. In addition the word 'exposed' is introduced to AMC#2 M.A.302(d)2(d).

Point 2 c) Since this AMC is the first step to alleviate from the requirements, it is possible that further changes would cover the other components as well. Also please note that NPA 2012-17 'Part-M General Aviation Task Force (Phase I)' was issued and it is proposing some alleviation to ELA1 and in some cases ELA2 aircraft as well, , it introduces the Minimum Inspection Programme for ELA1 aeroplanes not involved in commercial operations, which is to be performed every annual/100 FH interval, together with the possibility of establishing the self-declared maintenance programme that provides further relief from DAH prescribed maintenance requirements.

Point 2 e) The term 'conclusive' means non-arguable, having clear evidence that the component itself and its accessories and parts are in serviceable condition and there are no visible wear signs which are out of the limits.

Point 2 g) The extension is either for calendar limit or for FH limit, although of course it depends on the OEM. If the original DAH TBO* limits are to be followed for both parameters separately, which rarely could be the case, the same approach should be applied to the extension. The 'intermediate' inspection is to be conducted at reaching 50% of the extension interval which TBO** - BO*/2 and has to be 'conclusive' as well, and TBO** itself cannot be more than 20 % of TBO*.

Point 3 The text of the NPA was changed in order to allow the TBO extension on components installed on aircraft used for towing and training. An extension of maintenance tasks is always possible for CAT operators as stated in M.A.302(d)(iii)/AMC M.A.302(d)(7). It would require substantiation data in form of reliability statistics and periodic reviews, which are probably not collected and

certainly not conducted/analysed by default by most of the CAT operators of non-complex piston engine aircraft. The operators that apply the reliability analysis definitely should be able to benefit from it.

Taking into account the provisions of the discussed NPA operators of non-complex piston engine aircraft will be able to extend the intervals of certain maintenance tasks if they follow the process applied for large aircraft but not the recommended components/engines TBOs under the provisions of AMC#2 M.A.302(d).

For engines service experience please refer to the response to comment No 93.

Point 3 b) The proposed provisions are merely applicable for commercial operations other than CAT. They establish the conditions that the overwhelming majority of such operators will not be able to accomplish. Please also refer to the response to comment No 21.

GM M.B.301 (c) Please refer to the response to comment No 93.

Appendix XIV to AMC#2 M.A.302(d) Signs of wear of rubber parts, sealing and corrosion of inside parts can be detected during the oil filter and magnetic plugs checks; the compression check can show the deterioration in case of heavily progressive corrosion.

comment

148

comment by: UK CAA

The gliding community has had a positive experience during the period that Generic Requirement (GR)24 and its predecessor Airworthiness Notice 35 has been available and there has been no evidence of an adverse safety impact to this category of aircraft operation.

At the same time we would like to offer a similar comment with respect to application of Generic Requirement 24 to self-launching and self-sustaining sailplanes used for commercial purposes (typically remunerated flying training in the club environment).

Experience in the UK fleet has not indicated that there has been an adverse safety impact resulting from the application of the policy set out in GR24. Therefore, it is considered that operators of the types of aircraft described above, when used for commercial purposes, could be unnecessarily penalised if they were required to adhere to the proposed AMC as there is no proven safety case to support the proposal.

For the reasons stated we request that these additional comments be fully considered by the Agency before deciding on its final position.

response

Accepted

The text of Draft NPA was changed in order to allow component TBO extension on aircraft used for towing and training. Additional inspections should be applied in this case. Nevertheless, the limitation on aircraft used for ab initio training is maintained.

TITLE PAGE p. 1

comment

5

comment by: AOPA-Sweden

Attachment [#1](#)

This is the position of AOPA-Sweden on NPA 2011-15, Non-binding guidance on TBO limits:

The following comments apply to piston Aero Engines for non-complex aircraft not used in commercial operations.

The Time Between Overhauls (TBO) as recommended by the Type Certificate

Holder (TCH) is in general disseminated in the form of a Service Letter or – Instruction.

The competent authority issuing the first Type Certificate (TC), (one can almost equal this expression to the FAA), did not include the TBO in the TC as an Airworthiness Limitation, nor are any engines affected by AD-notes limiting the TBO as far as is known.

For those engines where EASA has issued a TC to replace the original TC issued by the FAA, there are likewise no Airworthiness Limitations on the TBO or AD-notes to that effect.

What is the reason for this?

For the private operator of an US-registered aircraft, the TBO is a recommendation with no legal power whatsoever.

The continued airworthiness of his engine is assured by annual inspections where all relevant inspections including those in the NPA are carried out.

These inspections are also, without any known exception, included in the 100/200 hr/annual inspection lists issued by the aircraft TC-holder.

These lists are of course also used by the owners of EASA-aircraft when doing timed maintenance.

The net result of this is that the special inspections suggested by NPA 2011-15 to be carried out at the end of the recommended TBO have in fact been carried out each 100 hours or annually ever since the aircraft or engine was first placed into service.

This way the engine is operated on-condition with regular performance and technical status checks. Any discrepancies or problems are of course addressed regardless of time in service of the engine or component. With these provisions the engine can continue to operate far beyond TBO. The limit to time in service will be when it is no longer economically viable to repair or replace individual worn out parts or assemblies.

Therefore NPA 2011-15 is superfluous if the aircraft TCH maintenance lists are followed.

AOPA-Sweden would also like to reference our suggestions for an improved Part-M as submitted in response to the letter (RHA/ime/R(4) 2011(D)53023) of Mr. Eric Sivel dated 4 July 2011.

These suggestions introduce annual/100hr inspections to replace the AMP for non-complex aircraft not used in commercial operations. If that suggestion is adopted, this NPA 2011-15 is indeed unnecessary.

If EASA still elects to make this NPA 2011-15 into regulation AOPA-Sweden has no further comments, the NPA is in itself acceptable and proportionate to General Aviation requirements.

It will however not contribute to flight safety for reasons given above.

Attached please find a typical TCH Inspection Report for comparison.

response

Noted

Item 1.1.16 of the Appendix I to AMC M.A.302 and AMC M.B.301(b) of Part-M ‘Content of the maintenance programme’ requires that the periods at which overhauls and/or replacements by new or overhauled components should be made, are mentioned in the AMP. The performance of maintenance in accordance with the maintenance programme is one of the fundamental requirements stated in Part-M.

The objective of this AMC is to introduce a uniform and balanced approach for general aviation aircraft. With its adoption, more freedom and flexibility will be given to the owners of concerned aircraft, allowing them to benefit from the application of condition centred maintenance elements.

Besides that, NPA 2012-17 ‘Part-M General Aviation Task Force (Phase I)’ was issued and it proposes some alleviations for ELA1 and in some cases ELA2 aircraft

as well. For ELA1 aircraft not involved in commercial operations, it introduces the Minimum Inspection Programme (annual/100 FH), together with the possibility of establishing the self-declared maintenance programme. It also provides further relief from DAH prescribed maintenance requirements. Nevertheless, most of the provisions of the AMC#2 M.A.302(d) are applicable to non-powered and piston engine aircraft other than complex motor-powered aircraft not involved in CAT, aerobatic flights and IFR linked components.

comment 6 comment by: *BOSIO MOTORI AERONAUTICA SRL - PART 145*

we are a PART 145 and PART M organization , we overhaul piston engines for aircraft.
Many Private owner around Europe are using less octane fuel by some STC approved on their aircrafts , this will put more wear in the long run for those engines and, approving them an increase on overhaul TBO IS NOT an increase in safety as well. About this matter should be take in consideration on the AMC
Claudio COSSANDI CAMO / Tech. Manager BMA
BOSIO MOTORI AERONAUTICA SRL - BMA Via Campagna di Brescia, 6
25018 Montichiari (BS) - ITALY EASA ca n. IT.145.0172

response *Not accepted*

The inspection is proposed as alternative to the overhaul and the Appendix to the AMC is providing different possibilities to determine the deterioration of the engine condition, such as examination of oil filters/magnetic plugs, oil consumption check, compression check, power checks. Furthermore, the standard to which an engine should be inspected should be described in the maintenance programme.

comment 7 comment by: *Baines Simmons Limited*

We support the principles behind this NPA, the consultative approach taken, and the proposed text, as we feel it does provide for a clear and unambiguous "level playing field" throughout Member States.
However, we are interested in the choice of words for the title of this document "Non-binding guidance on TBO Limits", and in particular the words "non-binding guidance".
It is our understanding that within the EU's rulemaking structure, only Regulations and Directives are considered legally "binding". The Agency does have an obligation to issue AMC and GM under Articles 18 & 19, however these are all (generally) understood to be "non-binding" or "soft" rules. In this particular case, NPA 2011-15 proposes to issue amendments to existing AMC material and therefore is to be considered "non-binding"
We suggest that this wording may cause confusion in the minds of approved organisations, as well as owners of applicable aircraft and other stakeholders. For future reference, we would recommend the avoidance of such terms within the titles and texts of such documents, and in this particular case suggest the title might read:
"Extensions to component (including engines) TBO limits", or
"Extensions to Type Design Holders'/manufacturers' TBO limits".

response *Accepted*

comment 35 comment by: *AOPA-Sweden*

	Comments on NPA 2011 - 15 AOPA Sweden	
response	<i>Noted</i>	
comment	36	comment by: <i>AOPA-Sweden</i>
	Attachment #2	
	Comments on NPA 2011 - 15 with attachments AOPA Sweden	
response	<i>Not accepted</i>	
	<p>Para 2: In accordance with M.A.302(d)(ii) the maintenance programme should establish compliance with instructions issued by TC/STC holders or other design approval holders. Also M.A.302(e) states that the maintenance programme shall contain details, including frequency, of all maintenance to be carried out. The proposed AMC gives an explanation of alleviation from these requirements that was already provided for by M.A.302(d)(iii).</p> <p>Para 3: The maintenance tasks mentioned by you, as the 50, 100 and 200 hours inspection can be referred to as aircraft maintenance checks. The purpose of such tasks, among others, is to inspect the external condition of the aircraft and components and to perform some functional/operational checks when needed. They cannot be taken as an equivalent with the components' overhauls recommended by the OEM where the component is usually removed, disassembled, cleaned, inspected, repaired as necessary, and then reassembled and tested in accordance with the applicable maintenance data. Nevertheless, the item 4 of AMC#2 M.A.302(d) – Time Between Overhauls gives a possibility to apply complete condition monitoring maintenance programme for components, instead of applying the TBO, subject to certain conditions and approval by the competent authority. Also the proposed NPA 2012-17 'Part-M General Aviation Task Force (Phase I)', introducing the Minimum Inspection Programme for ELA1 aeroplanes not involved in commercial operations, gives further relief from maintenance programme requirements.</p> <p>Para 4: Comments on the text in the NPA - All Regulations, AMC and GM text is subject to the Agency's rulemaking procedure and it is drafted by the Agency. Of course the specific portions of the better worded paragraphs could always be proposed through the CRT tool. The Draft Decision is mostly concentrating on piston engines but, nevertheless, gives a possibility to extend the TBO of other components. The example as was said would limit the range of components. For the 50, 100, 200 hours inspection response, please refer to the Para 3 above.</p> <p>Para 5 – Suggestion – M.A.302 is proposed to be changed by NPA 2012-17 by adding the item (h) which gives the owner of ELA1 aircraft an alternative option in relation to establishing the maintenance programme.</p>	
comment	63	comment by: <i>SVFB/SAMA</i>
	Comments of SAMA to 2011-15 v02	
	Swiss Aircraft Maintenance Association, a member of ECOGAS, represents most of the maintenance organisations in Switzerland.	
response	<i>Noted</i>	
comment	82	comment by: <i>Luftsport Verband Bayern / Germany</i>

	<p>We appreciate the NPA but do not agree with chapter 4.1 of Appendix XIV. We think that the power check as described there is far too complicated for ELA1 aircraft and the correction factors will not be available.</p> <p>A detailed internal and external inspection together with a ground run or a flight test to check for obvious missing power or bad engine characteristics should be sufficient.</p>
response	<p><i>Partially accepted</i></p> <p>The power check is one of the tests that may be necessary to assess the condition of an engine as stated by 2.2 of Appendix XIV to AMC#2 M.A.302 (d). There are other options available for concerned aircraft in the mentioned Appendix. All of these methods, published in Appendix XIV to AMC#2 M.A.302 (d), are taken from guidance already applied by the Member-States and are based on Agency experience.</p> <p>Additionally, the reference is added to the Appendix XIV to AMC#2 M.A.302 (d) – Inspection to Time Between Overhauls for the Correction Factor guidance.</p>
comment	<p>102 comment by: <i>Air Technology Belgium</i></p> <p>Comments of Air Technology Belgium to NPA 2011-15.</p> <p>As Robinson Dealer / Service Center, holding EASA Part 145 and CAMO approval, our comments will mainly be focused on the Robinson Helicopters.</p>
response	<p><i>Noted</i></p>

EXECUTIVE SUMMARY

p. 2

comment	<p>50 comment by: <i>Aero-Club of Switzerland</i></p> <p>The Aero-Club of Switzerland with its now 23'000 + members supports the initiative of the Agency in favour of the sports and recreational aviation community. Always bearing in mind that for our members a consequently applied "on condition" maintenance represents the most cost-effective solution we recognise that such a one will not yet find political acceptance. We therefore support fully the Agency's proposals for the time being. In the long run we favour the "on condition" maintenance for all aircraft up to a CMTOM < 2'730 kg operated by clubs or private individuals, also for training flights.</p>
response	<p><i>Partially accepted</i></p> <p>Please refer to response on the comment No 39. In relation to training activities please refer to the response to comment No 11.</p>
comment	<p>74 comment by: <i>MecaNair SA</i></p> <p>Mecanair SA is a PART 145 company which makes the maintenance of aircrafts as well as the overhaul of any engines and accessories, Mecanair benefits from an experience on the ground of more than 35 years. Mecanair SA is globally set against the extension of the TBO essentially for reasons of responsibility from involved actors.</p>

	<p>Indeed when a TBO will be reached, if the operator does not arrange financial resources to make the overhaul he will wish to extend his TBO independent of the state of the component; he is then going to ask to the maintenance company to extend the TBO.</p> <p>The PART 145 company is going to assume the risk of the extension according to an economic pressure (the customer has no means to overhaul and the Part 145 does not want to enter in disagreement with his customer by immobilizing the aircraft).</p> <p>It is evident that the manufacturer gives a valid TBO for the most part of the conditions of operations and that in many cases he would be reasonable to extend this TBO quite as in the some other case the TBO is not reachable but it is desirable that these extensions are defined by technical observations fair for all the operators rather than by a financial competition.</p> <p>It will be expected to create a legislation which gives responsibilities to the operator in the case of an extension of the TBO.</p>
response	<p><i>Not accepted</i></p> <p>The practice of extending TBO for non-complex piston aircraft components is already being applied in some of the Member States.</p> <p>The inspection for the extension of the TBO are to be performed by appropriately rated organisations and, in some cases, by certifying staff. They should apply some engineering judgement, take the responsibility for the results of the inspection, and define the corrective actions when necessary. In addition the inspection standards, test condition and pass-fail criteria should be defined in the approved maintenance programme prior to the extension.</p> <p>The aim of the implementation of this AMC is to introduce the uniform approach for General Aviation aircraft. With its adoption, more flexibility will be given to the owners of concerned aircraft, allowing them to benefit from the application of condition centred maintenance elements.</p>
comment	<p>97 comment by: <i>Vliegwerk Holland BV</i></p> <p>Before the introduction of PART M, in Holland we easily could extend life limit components. When an engineer or company find the component satisfactory it was allowed to extend an overhaul or replacement. With the introduction of Part M the national authority became responsible for all extensions. Due to lack of experience by the CAA-NL there was almost no space to fly on with a part or component after the recommended TBO or replacement. A lot of owners had to spent a lot of money in overhauling components and renewal of parts.</p> <p>When this NPA becomes an AMC, the Dutch Maintenance Directive for O/C maintenance will probably change to harmonish it with other EASA countries. Easier again for privately operated planes, but when this NPA was introduced at the same time as the introduction of Part M they could have saved a lot of money. For Commercial Air Transport and aerial work it will become far more expensive; no extension allowed.</p> <p>This will again have great financial influence on a considerable number of aircraft operators.</p> <p>Why is this proposal not made before Part M went active?</p> <p>In general this happens more often in rulemaking. Of course rules will change, but now we have to change the same things every few years. Whats the reason and purpose of all this?</p> <p>Within some time we spent more time behind our desk then at the aircraft itself.</p>
response	<p><i>Noted</i></p>

Please refer to the response to comment No 99.

comment 103 comment by: *Air Technology Belgium*
 As Part 145 and CAMO organisation for helicopters registered in several different countries, we appreciate the intention of this NPA that will hopefully eliminate the differences between the competent authorities.

response *Noted*

comment 122 comment by: *WESERTRAINER FLIGHT TRAINING*
 We appreciate the efforts of EASA to harmonize aircraft maintenance standards in Europe at all.

response *Noted*

comment 144 comment by: *SVFB/SAMA*
 Principally our members appreciate this more liberal approach of EASA.

Clarify what is "smaller aviation". (we would call it the "third segment" of leisure, sports, private and not real CAT) We suppose it means as later in the doc < 2730 kg.

The authorities approach to set the interval for overhaul is to follow the manufacturer: by doing so, you are changing a recommendation into a limit. This is not the intent, otherwise the manufacturer would make it a limit and mandatory.

response *Noted*

A. Explanatory Note - I. General

p. 4

comment 17 comment by: *British Gliding Association*
 General
 These comments are submitted on behalf of the British Gliding Association BGA welcomes a sensible relaxation of strict TBO rules for engines and certain components for ELA-1 aircraft. We are In favour of a more consistent and experienced based approach.

response *Noted*

A. Explanatory Note - IV. Content of the draft Decision

p. 5-7

comment 8 comment by: *vliegbedrijf Tom van der Meulen*
 item 9.1 page 6 4th dot
 Not clearly is stated " affected.... kept." what a is ment with an approved company, can this be any Part 145 organisation, of has this to be an specific approved organisation e.g. a propeller shop to check a o/c propeller. I believe it should be more clarely that this can be done by any approved maniteance organisation and/of licensed mech.

response *Partially accepted*

According to the Draft Decision item 2(a) of the AMC#2 M.A.302 (d) it has to be done by appropriately rated maintenance organisation, meaning organisation with a rating to maintain the component or by M.A.801 (b)2 certifying staff as stated in M.A.502(a) and (d). The relevant paragraph 2(a) of AMC#2 M.A.302 (d) is changed accordingly to exclude the possibility of performance of maintenance by A-rated organisation.

comment 38

comment by: *Royal Danish Aeroclub*

From Royal Danish Aeroclub we have the following comments:

-As statistics show that the first 400 hours after overhaul poses highest specific risk of catastrophic engine failure for piston aero engines, it makes good sense to reduce the number of overhauls by extending operational life beyond manufacturers recommended overhaul times, and aiming for a uniform and level playing field in Europe, is welcome !

- There is no reason for making this quest anymore administratively complicated than necessary, and a system of reoccurring 20% extensions on overhauls is just that ! The same level of improved safety would be attained by simply stating that: A piston engine may remain in service beyond manufacturers recommended overhaul times as long as specified criteria are met . It should be noted that the criteria outlined in this NPA must be fulfilled for engines that have not reached recommended overhaul time as well as for those that have; so the main difference is merely when you start checking these criteria.

Whether or not a max. 40% extension should apply for engines in commercial use, as seen from a flying safety point of view, is difficult to determine from statistics, as so far very little data is available in this segment, but at some point increasing technical "down time", as a result of more frequent component change to remain within criteria, would warrant overhaul from an economic as well as an operational point of view .

-To run aircooled aero-engines on ground for more than brief periods at high power settings is not desirable, and for tailwheel aircraft pose a significant risk of nose-over if aircraft is not strapped down securely. An alternate means of determining condition of engine core could be to measure valve stem travel to be within set limits !

-If an engine has no significant oil consumption, has good compression on all cylinders, has no signs of overheating or other damage, there is no reason why this engine should not be allowed to remain in service after TBO just because it has at some point been used for special activities. If criteria are not met, the problem would have to be rectified regardless.

response *Partially accepted*

The inspection at the TBO* interval is a precondition for satisfying a TBO extension. It provides for certain means to determine engine condition.

Concerning the 20 % please refer to the response on bullet 2 of comment No 42. TBO extension is voluntary and the owner can always follow the recommended TBO schedule if he/she would like to benefit from it.

Concerning CAT operators, the highest possible level of flight safety is a prerequisite for obtaining the AOC, and the conditions for operation under the CAT AOC should be proportionate to the complexity of operations and the risk involved, and should be based on a risk assessment.

The power checks and the other methods mentioned to determine condition of engine are taken from the guidance already applied by some Member-States; and those methods are most frequently used, but nevertheless other methods that are

effective could be used as well, if they are approved as part of the maintenance programme. The corresponding provisions are added to the text of the Appendix XIV to AMC#2 M.A.302 (d).

comment 41 comment by: René Meier, Europe Air Sports

9. Proposed approach for this NPA:
 9.1, bullet 7: We kindly ask for two extensions of 30 % instead of the proposed 20 %.
 Rationale: As all aircraft engines are checked before any take-off, eventual malfunctions would easily be recognised, no disproportionate risk exists, therefore we ask for two extensions of 30 % for all privately used non-complex motor-powered and non-powered aircraft.

response *Not accepted*

The purpose of the proposed guidance is to extend the existing TBOs recommended by the DAH. The aim of alternative measures to the overhaul qualified as inspection and described in said AMC is not likely to be reached during the visual pre-flight inspection. The value of 20 % is taken from the general industry experience and the guidance already implemented by some Member States' competent authorities.

comment 42 comment by: René Meier, Europe Air Sports

9. Proposed approach for this NPA:
 9.2 bullet 1: We do not think that the provision stated is necessary.
 Rationale: Aircraft arrive with a TC or with an STC, so experience made in the past is known to all concerned within the aviation community. Therefore, such a restriction is not contributing to safety, only to increase costs.
 9.2 bullet 2: We do not agree with the content of this sub-paragraph. We are in favour of a more positive approach, e.g. "A request for the two 30 % TBO extensions submitted by a CAMO familiar with an aircraft and its equipment should be answered positively by the competent authority."
 Rationale: Our proposal enables aircraft owners, aircraft operators, maintenance organisations and competent authorities to gain experience on aircraft and equipment. Only based on such data evidence based maintenance will be possible.

response *Not accepted*

Bullet 1: The products have a different service experience depending on the date of entering into the service of type of product. Even more, certain competent authorities could have a different experience depending on the existence of such aircraft on their register.
 Bullet 2: The value of 20 % is taken from the general industry experience and the guidance already implemented by some Member States' competent authorities.

comment 51 comment by: Aero-Club of Switzerland

IV. Content of the draft Decision
 8. Description of today's scenario: That's exactly what we are suffering from: The competent authorities are following different approaches in respect of TBO's, we are miles away from the level playing field asked for by the politicians, the idea many times not followed by the competent authorities of the home countries of the politicians. To correct this we fully support the Agency's idea of strict application of common rules.

response	<i>Noted</i>
comment	<p>52 comment by: <i>Aero-Club of Switzerland</i></p> <p>9. Proposed approach for this NPA: 9.1, bullet 7: The Aero-Club of Switzerland asks for two extensions of 30 instead of 20 % each. Rationale: Before every take-off the engines are carefully checked, eventual malfunctions will be recognised as such, no disproportionate risk exists. We therefore ask for this higher percentage for all non-powered aircraft and non-complex motor-powered aircraft with a CMTOM of < 2'730 kg used by private individuals and by clubs, also for training flights.</p>
response	<p><i>Not accepted</i></p> <p>Please refer to the response to comment No 41.</p>
comment	<p>53 comment by: <i>Aero-Club of Switzerland</i></p> <p>9. Proposed approach for this NPA: 9.2 bullet 1: We do not think that this provision is useful. Rationale: Aircraft/parts/appliances arrive with TC or STC, so experience made in the past is known to the whole community. The restriction you ask for is not adding to safety, only to costs. 9.2 bullet 2: We favour a more positive approach: "A request for the two 30 % TBO extensions submitted by organisations/individuals familiar with the individual aircraft and it's equipment should as a standard solution be answered positively by the competent authority." Rationale: This proposal enables all organisations/individuals concerned with the operation of the individual aircraft, and the competent authorities, to gain experience. Based on this, evidence based maintenance measures could finally be set up.</p>
response	<p><i>Not accepted</i></p> <p>Please refer to the response to comment No 42.</p>
comment	<p>61 comment by: <i>SVFB/SAMA</i></p> <p>In respect to the often cited level playing field: more concern should be given by EASA to proportionate rule-making as is the case in this NPA. As correctly stated, if a less restrictive rule works in one NAA without safety shortcomings, it must work in all the other NAA's satisfactorily as well. It seems that in the past the rule-making with the exception of this NPA always ended on the most restrictive level of one of the participating NAA's. The result is that more and more SME's give up, a very unhealthy trend in the EU in economical difficult times. SME's are within EU are providing 60 % of the economical output and adapted rule-making would help them to continue. This is not the case at present. The restrictions have to be more stringent proportionate to risks and associated accident potential and be less stringent and create less authority involvement for smaller risks and accident potentials. We see a constant inflow of complaints from our members who are citing examples of less restrictive handling of specific rule application around us. We do not advocate stricter handling in those cases around us, but more</p>

response	<p>proportionate handling by those NAA which are unwilling to change to less restrictive regulations.</p> <p><i>Noted</i></p> <p>This NPA is proposing to apply the same procedure and conditions on extension of components' TBO on the non-complex piston engine and non-powered aircraft taking into the account the balanced approach which is believed to provide for a level playing field and to introduce the common practices in all Member-States.</p>
comment	<p>62 comment by: SVFB/SAMA</p> <p>We think the proposal on this page a progress in the right direction.</p>
response	<p><i>Noted</i></p>
comment	<p>64 comment by: SVFB/SAMA</p> <p>We fear however that the gain in cost reduction by an sensible reduction in TBO will be more than lost by complex and bureaucratic approval of the maintenance programme approval and associated paperwork by the NAA's.</p> <p>This statement is based on the finding, that our SME members ratio of productive versus administrative staff has changed from 8 % to an unbelievable and unpredicted 45 % since EASA, a deadly ratio, topped by a similar or worse increase in Authority oversight costs.</p> <p>The 20 % increase should be extendable according enough collective experience. Club aircraft and schools as well as sightseeing flights, operating in well known environment, should be able to use the TBO extension as well.</p> <p>Calendar time limits could be more than 33% or cold be none. The decision should be made by licensed and experienced mainteance personel. (is this not the reason we train them tehoretically and practically and take tests ?, what value are you giving this education if you are not allowing the privileges ?)</p>
response	<p><i>Not accepted</i></p> <p>The said AMC provides for approval of the maintenance programme by the CAMO – namely, indirect approval. Besides, even the approval of extended TBO maintenance programme by the NAA is a one-off time exercise, from which the owner would benefit for a long period of time.</p> <p>The value of 20 % is taken from the general industry experience and the guidance already implemented by some Member States' competent authorities.</p> <p>The text of NPA was changed and now only the ab initio training is excluded from the TBO extensions, because this is a special activity where it is vital to ensure aircraft/component serviceability and failure of components/systems may become critical in certain situation.</p> <p>Concerning the calendar limits please refer to the response to comment 67 below. Concerning the possibility of TBO extension made by the mechanics please refer to response to the comment 146.</p>
comment	<p>67 comment by: SVFB/SAMA</p> <p>Calendar limits and operating hours limits should not be considered with the same importance at least not for whole engines and whole propellers. There is a</p>

tremendous positive experience that piston engines can be operated safely beyond the calendar limit, which for many TCM is only 10 years for example. Also propellers may easily be extended beyond the 5 years limit of McCauley for example. The proper protection of the aircraft in a Hangar has a very positive effect on a possible extension of owner operated aircraft with low utilisation.

response *Noted*

Calendar term, in most of the cases, is dictated by environmental damage, which may occur to the component/aircraft and which may depend on the storing conditions. That is why it takes into account the most severe conditions. The NPA cannot consider all the different possibilities for storage/parking conditions but rather rely on the positive inspection results as a precondition for TBO extension.

comment 76

comment by: *Howard Torode*

The European Gliding Union applauds EASA's introduction of this measure which mirrors the practices of 'on-condition' maintenance in current use for non-CAT GA aircraft in many European nations. The basic intent described in NPA section IV 9.1, and the provisions contained in AMC MA302 (d)2 are appropriate.

However we believe that the breadth and scope of the measure as described in NPA section 9.2 and AMC MA302 (d)3, and the role of the NAA in AMC MB301(c) requires some liberalisation and optimisation:

- Specifically, we see no justification in withholding these flexibilities for 'towing' (assumed to include glider towing). In most developed nations options associated with TBO extensions have been in current use for many years with documented safety records and no safety issues. In the wholly non-CAT environment of gliding operations the lack of this flexibility would cause new restriction and major inconvenience and attendant running cost escalations. While the EGU Board can recognise that the use of the term 'certain operations' in Section IV 9.2 (3rd bullet) has been chosen to leave some National flexibility, it must be made clear the gliding operation should benefit from these measures.
- The 'competent authority' (assumed by default to be the NAA), is not best placed to fulfil the roles described in GM MB301(c). Considerations of experience are more correctly laid on the associated CAMO who will have much greater 'hands on' data and experience to make TBO extension decisions. For this reason also, the balance of judgement on individual aircraft, whether with low calendar time or flying hours is best left to the relevant CAMO. The low flying hours restriction is very likely to cause major hardship as it is exactly these low utilisations of sport/general aviation that leads to the justification for the original relaxation on TBO criteria.
- We feel that the detailed Guidance Material in Appendix XIV to AMC MA302 (d) could usefully be expanded with information available from appropriate National Sources.

response *Noted*

Please refer to the response on comments No 148 and 27. In relation to the expansion of the Guidance Material to the other components, the guidance available from Member-States could not be integrated to this NPA due to different

approaches followed for the components other than engines.

comment 85 comment by: CAA-NL

The CAA-NL supports the NPA to allow aircraft owners under certain conditions to deviate from the recommended TBO-limits by the design approval-holder.

response *Noted*

comment 86 comment by: CAA-NL

response *Noted*

comment 88 comment by: CAA-NL

On Paragraph 8: It would have been interesting if the FAA-system would have been considered because the FAA has vast experience on piston engine aircraft exceeding their TBO's, also being State of Design of the most frequently used piston engines or other components.

response *Noted*

The FAA guidance, namely the AC 20-37E on Aircraft propeller maintenance, was reviewed during the preparation of this NPA.

Besides that, NPA 2012-17 'Part-M General Aviation Task Force (Phase I)' was issued and it is proposing some alleviation to ELA1 and in some cases ELA2 aircraft as well. For ELA1 aircraft not involved in commercial operations, it introduces the Minimum Inspection Programme (annual/100 FH), together with the possibility of establishing the self-declared maintenance programme. It also gives further relief from DAH prescribed maintenance requirements. These inspection requirements are in line with the requirements of FAR 91.409 Inspections.

comment 96 comment by: António Veiga

Dear Sirs;

First of all let me congratulate the author(s) of this document, since this is a big step forward on EASA's role.

Nevertheless, I find the document a little ambiguous as it, sometimes, refers to "aircraft components" and, other times, it refers specifically to aircraft piston engines.

I would suggest you to revise the document in order to clarify any doubts.

By other side I couldn't agree more with the procedures proposed for the piston engines TBO extension, however, I would suggest a similar procedure for the light aircrafts' propellers:

- **Constant speed propellers:** maximum allowable extension, provided positive results on a detailed inspection are obtained, of 20% either by calendar time either by flight hours;
- **Fixed pitch propellers:** maximum allowable extension, provided positive results on a detailed inspection are obtained, of 25% plus 25% either by calendar time either by flight hours;

response	<p><i>Noted</i></p> <p>The AMC itself already has the values which could be applied to the different components and not only to the piston engines. Nevertheless, the Appendix XIV to AMC#2 M.A.302 (d) - Inspection to Time Between Overhauls is drafted only for extension of TBOs of piston engines.</p> <p>Also refer to the reply to comment No 88 above.</p>
comment	<p>98 comment by: <i>Vliegwerk Holland BV</i></p> <p>We think there must become a difference between CAT flights with smaller planes and with bigger planes. An extension of components and parts of 2x 20% must be possible for small planes flying under an AOC and Aerial Work. TBO extensions for this kind of planes with a <u>small</u> number of seats should be possible.</p> <p>And is there a difference in the On Condition policy between AOC A-A operators and AOC A-B operators for the general aviation. Because flight of an AOC A-A operator are called (commercial operations) and not Commercial air transport. Should NPA2011-015 become a law in Holland this again will have rather consequences for the "small" AOC holders.</p> <p>More responsibility should be given to the CAMO organisations. They have the real experience which is needed to give extensions.</p>
response	<p><i>Partially accepted</i></p> <p>In accordance with item (3)(a) of the AMC#2 M.A.302(d) the TBO extension is not applicable to the components on aircraft involved in CAT operations, ab initio training activities and aerobatic flights.</p> <p>Components installed on all other aircraft covered by criteria mentioned in item (2) of the AMC#2 M.A.302(d) are eligible for at least two extensions.</p> <p>Concerning the CAT operators, the highest possible level of flight safety is prerequisite to obtaining the AOC. The conditions for operation under the CAT AOC should be proportionate to the complexity of operations and the risk involved and they should be based on a risk assessment.</p> <p>Besides that, an extension of maintenance tasks is always possible for CAT operators as stated in M.A.302(d)(iii)/AMC M.A.302(d)(7). It would require substantiation data in form of reliability statistics and periodic reviews, which are probably not collected and certainly not conducted/analysed by default by most of the CAT operators of non-complex piston engine aircraft.</p> <p>Taking into account the provisions of the discussed NPA the CAT operators of non-complex piston engine aircraft will be able to extend certain maintenance tasks if they follow the process applied for the large aircraft but not the recommended components/engines TBO under the provisions of AMC#2 M.A.302(d).</p>
comment	<p>104 comment by: <i>Air Technology Belgium</i></p> <p>We have a major problem with the fact that this TBO extensions are only applicable for aircraft not used in commercial air transport.</p> <p>Once again it is clear that the EASA regulations are written by-, and written for the "Large" Commercial Air Transport (= Large commercial jet airplanes flying from and to airports with all necessary handling/servicing available on site)</p> <p>We hope that one day, EASA will realize that there are other type of aircraft, like helicopters, that are used for commercial activities but that do not operate from airports and can change quickly (and multiple times) from private use to commercial use. We certainly don't want lower standards but it is impossible to follow the same rules for the different type of aircraft/activities.</p>

Although we maintain all our helicopters to the Part 145 standards, regardless their use (because this can change frequently), we are "punished" once again for meeting the higher standards.

Is there any logic behind the fact that a helicopter that has been maintained by a Part 145 for 2000 hours can not use the extension as opposed to a helicopter that has not been maintained by a Part 145?

Although this NPA is created to standardise the TBO extensions, it will give certain NAA's the perfect tool to refuse any TBO extension for aircraft used in commercial activities. Once again, it will only raise the operating cost (for commercial use) without any positive effect on aviation safety.

More specific for the Robinson helicopters, we have the problem that Robinson Helicopter Company sets a TBO of 2200 hours for the complete airframe. The engine manufacturer, Lycoming, however has a recommended TBO of 2000 hours. This means that we would have to change/overhaul the engine for the last 200 airframe hours.

It took us nearly 6 years to convince our NAA's that there is no reason to refuse the extra 200 engine hours (in accordance with a TBO extension programme). By this NPA, we will easily lose this privilege again while the same helicopter (non-commercial) can have an unlimited extension (as opposed to the 1-time 10%)

response *Not accepted*

Please refer to the point 3 of response to comment No 147 and to the response to comment No 13.

comment 105

comment by: *Air Technology Belgium*

We understand that there has to be a certain knowledge of the individual aircraft before extending the TBO intervals but why does EASA forget the CAMO organisations?

§9.2 (first item) would mean that if we, as the CAMO, are following a specific helicopter for 1950 Hrs, the owner can not sell his helicopter to another EASA country because the new owner would not be able to ask the TBO extension (< 100 hrs on the new register)?

Please take the CAMO knowlegde into consideration.

response *Noted*

According to the GM M.B.301 (c)(1) the competent authority may decide not to extend the TBO of the component for the first year/100 FH of the operation of the individual aircraft since the new registration. Thus, the competent authority of the new state of registry approving the maintenance programme can either accept extended TBO or require the overhauls to be accomplished prior to the registration of the aircraft.

comment 116

comment by: *AESA (SPAIN)*

A. Explanatory Note

9. Proposed approach for this NPA:

..

. Tests conditions and pass-fail criteria should be defined for the inspection tests before they are performed, based on the components' typical parameters provided by the manufacturer. These conditions and criteria should be part of the

	<p>approved maintenance programme. The last expression of this paragraph implies then that the Approved Maintenance Programme needs to contain such test conditions and pass-fail criteria. However, the draft of the regulation of this NPA does not modify M.A 302, AMC 302 or the Appendix I to AMC M.A.302 in that respect.</p>
response	<p><i>Accepted</i></p> <p>The text of the item 2(c) of AMC#2 M.A.302 (d) was changed accordingly as 'In addition to the Appendix I to the AMC M.A.302 and AMC M.B.301(b) - Content of maintenance programme these standards, conditions and criteria should be considered part of the aircraft maintenance programme'.</p>
comment	<p>127 comment by: <i>EFLEVA</i></p> <p>We do not understand the limitation that authorities may not allow CAMO's to extend TBOs, if the authority considers it does not have enough experience with the type. The experience resides with the DAH and/or the operators of the aircraft. We consider that an authority should allow TBO extensions if it is presented with the relevant DAH and operator experience</p>
response	<p><i>Partially accepted</i></p> <p>The provisions of GM M.B.301 (c) should relate to the general industry service experience. Therefore, they were changed into AMC in order to allow NAAs to decline the proposed extension, as it is already practised by some NAAs.</p>
comment	<p>146 comment by: <i>SVFB/SAMA</i></p> <p>what we have noted after discussing with members who are operators and other who are overhauler:</p> <ul style="list-style-type: none"> • most operator tend to vote for the extension if applied with professional care • overhauler, based on their experience are making a clear distinction that they would apply an extension for certain engine manufacturers and for others they would not • they would take into consideration the conditions of aircraft storage: hangar, weather exposition • the overhauler are for professional but simply basic checks for which every licensed professional with the necessary experience is trained and with the req practical experience is able to do so • therefore he should have the right to do so, without any further administrative involvement, to keep the process efficient
response	<p><i>Not accepted</i></p> <p>This AMC is a tool to harmonise current practice applied in EASA Member States and it provides for some engineering judgement to be made by the certifying staff releasing the piston engine on behalf of a maintenance organisation. Meanwhile, in accordance with Commission Regulation (EC) No. 2042/2003, the overhaul of piston engines is not allowed to be performed by certifying staff except as specified in M.A.502(d) only for CS-VLA, CS-22, and LSA aircraft.</p>

A. Explanatory Note - V. Regulatory Impact Assessment

p. 7-8

comment	43	comment by: René Meier, Europe Air Sports
	<p>V. Regulatory Impact Assessment 10. Purpose and intended effect a. Issue which the NPA is intended to address: Looking at what happened to the idea of the Generic Maintenance Programmes we think that exactly here the Agency must enforce a common management idea of TBO. Rationale: "To avoid duplication" is one of the key elements of BR 216/2008. With regards to aircraft maintenance we are light-years away from this situation. We therefore urge the Agency to pay attention to the indeed necessary harmonisation among different European authorities.</p>	
response	Noted	
comment	48	comment by: René Meier, Europe Air Sports
	<p>V Regulatory Impact Assessment 12. Sectors concerned: Does the Agency dispose of figures in Euro indicating a trend with regards to maintenance cost to be calculated with today and in the future after adoption of a more liberal TBO regulation? Rationale: A comparison of today's figures with figures to be expected in future times would show the readers if we approach the level playing field or not. A possible benefit will greatly be reduced by the cost of organisations checking/testing/inspecting our aircraft.</p>	
response	<p>Noted</p> <p>The TBO extension is voluntary and the owner can always follow the recommended TBO schedule if she/he decides so or would like to benefit from it.</p>	
comment	54	comment by: Aero-Club of Switzerland
	<p>V. Regulatory Impact Assessment 10. Purpose and intended effect: Looking what happened to the intended effect with regards to Generic Maintenance Programmes we favour the most strict common rules possible to enforce common TBO rules. Rationale: Basic Regulation 216/2008 writes of "avoidance of duplications at European and national levels". Looking at aircraft maintenance we are miles away from this objective. We invite therefor the Agency to present stricter rules in order to obtain a really level playing field.</p>	
response	Noted	
comment	55	comment by: Aero-Club of Switzerland
	<p>V. Regulatory Impact Assessment 12. Sectors concerned: Does the Agency dispose of amounts in Euro indicating a trend with regards to the maintenance cost of today and the one's of the future after the proposed TBO extensions becoming "soft law"? Rationale: We are very much interested to learn about the effects of the TBO extension on the one hand, the cost of all the checks/tests/inspections mentioned</p>	

response	<p>on the other.</p> <p><i>Noted</i></p> <p>Please refer to the response to comment No 48.</p>
comment	<p>65 comment by: SVFB/SAMA</p> <p>We are sceptical as to the value of CAMO's with the exception of public air transport with a non integrated MRO.</p> <p>The CAMO has not added value to safety in the leisure and private flying segment, only costs and additional administrative burden for the SME Maint Organisation.</p> <p>This is true for both: those (SME) maintenance organisations whom have established their own CAMO as well as for those who depend on an external CAMO. They all claim an tremendous increase in paperwork without any increase in safety. In contrary, the unjustified heavy paperwork may "blind" the SME's from eventual problems.</p> <p>The exception is the maintenance organsiation with an integrated camo. The pure theoretical camo may not be close enough to the nuts and bolts to get the details like quality of the oil filter, compression check, general condition etc.</p> <p>(with this remakr we do not propose the CAMO having helped safety in GA and Business aviation, small maintenance organisations could have the CAMO task fully integrated into their organisation, avoiding additional *managers* bearing three different hats)</p>
response	<p><i>Noted</i></p> <p>This AMC#2 M.A.302 (d) provides for some engineering judgement to be made by the certifying staff releasing the components on behalf of the maintenance organisation. These decisions taken on 'acceptability' of the components are based on the results of the inspection done by the maintenance organisation in accordance with item 2(e) of the said AMC.</p> <p>Also, some privileges in relation to limited continuing airworthiness tasks are planned to be given to the maintenance organisation in accordance with the NPA 2012-17 'Part-M General Aviation Task Force (Phase I)'.</p>
comment	<p>87 comment by: CAA-NL</p> <p>Page 7, paragraph 11 'Options'.</p> <p>The possibility of another option: 'do not allow TBO extensions' is not considered at all, although this also creates a level playing field. For completeness and a possibility to compare all options it would have been interesting to know is this option had any considerable safety gains.</p>
response	<p><i>Noted</i></p> <p>The current regulation and the AMC do not have any provision directly allowing the extension of TBO of the concerned aircraft. Nevertheless, such practice exists and proved to be effective. Thus the purpose of this NPA is to promote a common and uniform approach in relation to the TBO extension of components installed on concerned aircraft among EASA Member States.</p>

comment	99	comment by: <i>Vliegwerk Holland BV</i>
	<p>In Holland AOC holders using small planes for A-A flights now could extend components and replacements in some cases. But the Dutch CAA will probably change their Maintenance Directive in order to harmonish with this NPA/AMC. For these AOC holders there will be rather impact of the introduction of this NPA/AMC.</p>	
response	<i>Not accepted</i>	
	<p>The aim of the implementation of this AMC is to introduce the uniform and balanced approach for General Aviation aircraft. With its adoption, more freedom and flexibility is given to the owners of concerned aircraft allowing them to benefit from the application of condition centred maintenance elements.</p>	

B. Draft Decision

p. 9

comment	13	comment by: <i>WAC</i>
	<p>Hi. My name is Carl-Johan Wall. I work as an aircraft engineer in Sweden and I also own an seaplane on floats, SE-KCO, a Maule M4-210C. This NPA is, if implemented, forcing me to ground my aircraft that I restored for four years (2006-2010) to mint condition as I can not afford a complete engine overhaul. A factory rebuilt engine is USD 31500. Ref AMC#2 M.A302(d) - para 2.f= "Airworthiness directives affecting the component and required to be completed at the time of overhaul should be completed not later than TBO." My engine, a TCM IO-360A is 35 years old but only has 514 hrs Total time. It has been conservated during most of the time 1980-2000. During the aircraft rebuild, a thorough corrosion inspection took place. All cylinders were removed and honed. Two pistons and three ringsets replaced. All work done by PART-145 shop. The engine is in very good condition. In accordance with Swedish CAA regulations BCL-M 3.4 pos 4.6, no calendar time TBO is due if regular corrosion inspections are performed. This means that at present, this engine has almost 1000 hours left to overhaul. FAA AD 97-26-17 is NOT performed as it is not due until engine major overhaul. (Crank shaft replacement due to NON-VAR crankshaft). If this NPA is implemented in full, my aircraft will not be airworthy until the AD 97-26-17 is performed. I can understand if this was applicable to engines/parts where the TBO in hours had been exceeded. I have no understanding for why, and strongly oppose, the implementation of the stated NPA, to in this case an engine, with only 514 hrs since new. Please keep in mind that making rules and legislations like these will reduce the flying community. General aviation as we know it is being minimized due to increasing costs and complex regulations. Soon You will have to be a millionaire to be able to own a PA-28. How many in EASA will have a job then...? With hopes of a brighter general aviation future for us all, best regards, Carl-Johan Wall.</p>	
response	<i>Noted</i>	

As for the existing aircraft with TBO extended not following the criteria of this NPA, it is believed that this AMC is setting the minimal standard and the Member States, based on their experience, should be able to take decisions on such cases. In no way this NPA has the intent to impose new provisions on the owners or the operators of concerned aircraft retrospectively.

comment 18 comment by: *British Gliding Association*

Content of the draft decision
9.2 ...additional precautions. First bullet point;
Excluding aircraft that have less than 12 months or 100 hours is too restrictive especially for sport and private aircraft (sailplanes and powered sailplanes) it could take several years to accumulate 100 hours. It would be more appropriate to insist on a full 20% TBO inspection at time of import.

response *Noted*

The AMC states either 100 FH or either 12 months meaning whatever is reached first, then one year would be sufficient in the abovementioned case. The decision should be based on the judgement of the competent authority and can also be to accept the extended TBOs.

comment 101 comment by: *Federal Office of Civil Aviation FOCA*

FOCA welcomes EASA's intention to develop guidance material on TBO/life time limitations as these limitations seem to be dealt with differently in certain Member States.

However, in the opinion of FOCA the content of the NPA does not address one of the main issues of TBO limits by not containing any guidance on how maintenance manuals are to be interpreted regarding the decision if a TBO is absolutely mandatory or just recommendatory.

The maintenance manuals of aircraft, engine and propeller manufacturers (TC-holders) are composed in a variety of ways. Best known are maintenance manuals containing chapter 4 (obligatory airworthiness limitations sections) and chapter 5 (recommended maintenance plan). However, several aircraft maintenance manuals are not based on actual certification specifications while others frequently only refer to engine and/or propeller maintenance instructions. In cases where the instructions of the engine manufacturer are only declared as a recommendation (e.g. TBO), the operators tend to interpret this limitation as non-binding in any case, regardless of where the reference stems from (e.g. chapter 4 of the aircraft maintenance manual). Guidance material on how such references are to be interpreted as whether a TBO is mandatory or just recommendatory would be much appreciated.

If a TBO can be interpreted as non-binding, the NPA gives useful instructions regarding alternative inspections/means of compliance to ascertain the conditions of i.e. an engine. Regarding the proposed engine power checks an earlier "trend monitoring" would be considered as reasonable (power checks just after reaching TBO limits are as such not an objective criteria).

Furthermore, even though the NPA covers certain components, it mostly focuses on engines. However, guidance should be developed for all type certificated products, not only for engines and propellers but for other components as actuators, pumps etc. as well.

response *Noted*

The maintenance documentation is organised in a variety of ways. In some cases

the TBOs or limited life components are only referenced in the aircraft maintenance manual (AMM), having the values indicated in corresponding engine/component manuals or in service instructions. The latter, when in combination with an AMM reference from the 'recommended maintenance' section, is often considered to be a recommended TBO. Notwithstanding that, there are some variations which cannot be easily grouped and defined at all times. More likely they are to be read and clarified on a case by case basis as they arise from the TC holders' ICA format. Also, please be informed that a new rulemaking task on ICAs MDM.056 has been started by the Agency in the 3rd quarter of 2009.

Power checks are one of the tests that may be necessary to assess the condition of an engine as stated by 2.2 of Appendix XIV to AMC#2 M.A.302 (d). The measures of the abovementioned Appendix are proposed as an acceptable alternative to 'engine trend monitoring', being a standard in CAT environment. For the components other than piston engines, please refer to point 2c of the reply to comment No 147.

B. Draft Decision - AMC#2 M.A.302 (d) – Time Between Overhauls

p. 9-10

comment 1

comment by: *Stefan Freudiger*

Calendar limits and operating hours limits should not be considered with the same importance at least not for whole engines and whole propellers. There is a tremendous positive experience that piston engines can be operated safely beyond the calendar limit, which for many TCM is only 10 years for example. Also propellers may easily be extended beyond the 5 years limit of McCauley for example.

Furthermore, IFR should not be more limited than VFR, as long as private flights are concerned. In private flights the pilot must anyway also be aware of any risks he may take when flying single engine in ground-fog or in dark-night. A careful pilot would take into consideration its TBO situation when balancing any risks.

Aircrafts which stay in hangars when not in use should benefit on the TBO side to compensate for the additional expenses of hangar costs. Hangared aircrafts have significantly less atmospheric and climate wear and are always in a much better state than aircrafts staying outside, at least when low hour aircrafts are concerned (for aircrafts flying daily, the impact is less important).

Aside the intensified inspections also some return from the intensified occurrence reporting system should be taken into consideration. Should any positive experience with TBO extensions from the past be affected, specific occurrence reports should reveal it.

Stefan Freudiger, dipl. Ing. ETH
40+ years aeronautical engineer, pilot, A&P
Bremgarten, 17 September 2011

response *Partially accepted*

For the calendar time TBO extensions please refer to the reply to comment No 67. For IFR flights, only the IFR linked equipment is not considered to be qualified for TBO extension as its failure could seriously impact continuation of flight in IMC.

comment 2

comment by: *Maintain a Plane*

Par. 2d During the inspection, all component's parts identified by the DAH for replacement at TBO

response	<p>* <i>should be individually inspected, replacing them if necessary.</i> Inspection is impractical ,for example: TCM SB 97-6B and Lycoming SB 240V list numerous parts for which replacement is considered mandatory at overhaul by the DAH ,inspection or replacement of these parts at the point of TBO extension is impractical</p> <p><i>Noted</i></p> <p>The purpose of the inspection is to confirm the condition of the component's constituent parts is satisfactory for the TBO extension together with the component. If the condition of certain component's parts is not satisfactory but the component generally fit for TBO extension, then those parts should be replaced in order to extend the TBO of the component. In addition, for further clarification, the term 'accessible part' is introduced to AMC#2 M.A.302(d)2(d).</p>
comment	<p>3 comment by: AVAG, Eugenio Lanza di Casalanza</p> <p>I am very pleased of that decision, this can really alleviate the costs of flying for private owners, but I think the whole regulation is too complicate and will add more costs on some countries where the TBO is already not mandatory. It would be easier to authorize the owners to mantain the aircraft and engines "On Condition" like it is in the USA or maybe in Germany or other open minded european countries. Moreover the inspections required should be allowed to the same mechanic that perform the whole aircraft maintenance, not specifically to companies specialized in engines or components, and over all it must not be "if the national authority agrees" because doing like so the more restrictive Authorities will not allow it. Please take into account that in countries like Italy it does not work that "everything not forbidden is authorized" but on the contrary "what is not specifically authorized is forbidden", this will lead inevitably differences with other european countries.</p>
response	<p><i>Noted</i></p> <p>The practice of extending the TBO for non-complex piston aircraft components is already being applied in the Member States. The aim of this AMC is to introduce the uniform and balanced approach for general aviation aircraft. With its adoption more flexibility is given to the owners of concerned aircraft, allowing them to benefit from the application of 'condition centred' maintenance elements. The inspections for the extension of the TBO are to be performed by appropriately rated organisations and, in some cases, by certifying staff who should apply some engineering judgement and take responsibility for the results of the inspection and define the corrective actions when necessary. However, the overhaul of piston engines is not allowed to be performed by certifying staff except as specified in M.A.502(d) and only for CS-VLA, CS-22, and LSA aircraft.</p>
comment	<p>9 comment by: vliegbedrijf Tom van der Meulen</p> <p>item AMC# M.A.302(d) number 3 addtional considerations The primary prupose of TBO extentions is to create the possibility to extent the service live of components. The airplanes used for e.g. training/towing or aerobatics are excluded of this TBO extention programm. Airplanes used for above mentioned (aerial) work are more regulary maintained and monitored, then most parivately owned aircrafts. The problem is that some airplanes do not fly</p>

	<p>enough to stay within the normal TBO times, due to specific use, aerobatic airplanes normally flies not more a 100 to 200 hrs per year and will exceed e.g. the TBO of the engine easily. In the considerations this type operations is excluded for the TBO extensions. The same problem will occur with training aircraft, a training aircraft will not suffer more than a privately flown aircraft.</p> <p>This article should be altered and only read: AOC aircraft are excluded from the TBO extension programme</p> <p>This also because to prevent different ways of complying by the local authorities and to avoid acting in contrary with the level playing field.</p>
response	<p><i>Partially accepted</i></p> <p>Please refer to the response to comment No 148.</p>
comment	<p>10 comment by: <i>Maintain a Plane</i></p> <p><i>1. the competent authority may decide not to extend the component's TBO when the individual aircraft has been under its register for less than 12 months or has flown under that registration for less than 100 flying hours. If necessary, CAMO procedures allowing maintenance programme indirect approval should be limited accordingly..</i></p> <p>This par. will render the amendment useless in addressing two of its major issues (quote par. 8 "This resulted in a non-level playing field for operators from different countries and creates difficulties for the transfer of aircraft between them.")</p> <p>The par. will only reinstate the difficulties in transferring an aircraft from one member states registry to another and therefore the non level playing field as well"</p> <p>Authorities (for once) will have to accept each others direct or indirect approved TBO extension programmes preferably indefinitely but at least for a limited period long enough to allow for a smooth transfer from one registry to another</p>
response	<p><i>Noted</i></p> <p>According to the corresponding paragraph the 100 FH/12 months requirement can be applied if the NAA does not have sufficient experience on individual aircraft, which does not mean that every imported aircraft will have to go through it. Nevertheless, the general industry service experience should be addressed in order to give NAAs the right to decline the proposed extension, as it is already practised by some NAAs.</p> <p>The maintenance programme approval is accomplished at discretion of the new Member State of registry and can be done with extended TBOs.</p>
comment	<p>11 comment by: <i>Maintain a Plane</i></p> <p><i>TBO extensions in accordance with this AMC#2 should not be considered for components installed in aircraft used in commercial air transport or training activities,</i></p> <p>Training should be removed from this consideration, every privately operated aircraft will be used for training at some point in time</p> <p>If not removed ,Training should be further defined to exclude type training, licence renewal training etc.</p>
response	<p><i>Partially accepted</i></p> <p>The text of NPA was changed and now only the ab initio training is excluded from the TBO extensions, because this is a special activity where ensuring of</p>

aircraft/component serviceability is vital and failure of component/system may become critical in certain situations.

comment 14

comment by: *Stefan Freudiger*

This comment refers to AMC#2 M.A.302 (d) (3) (a)

According to my own 40+ years of experience in this matter, I can't see any reason why TBO extensions could not be applied for private IFR-flights or for training activities.

Private aircrafts typically do not fly many hours per year. If 50 hours are being flown per year, a calendar TBO of 10 years would require removal and disassembly of a well running engine after as little as 500 hours, which can't make any sense. Aircraft engines are continuously checked, before each flight, at the run-up of each flight, during take off run, climb and cruise of each flight and at every regular inspection with a full cycle once per year. No pilot would take off with a doubtful engine, at least not in a single engine aircraft. Furthermore do the rulemakers not distinguish between hangared airplanes and airplanes parked outside. When talking about calendar periods, then seasonable effects are generally addressed. But seasonable effects are tremendously lower when hangared than when exposed to direct sunlight, direct rain, and quick temperature/humidity cycles. Hangar places normally cost much more than free air parkings, but the costs are balanced by less troubles and less maintenance required. Calendar TBO's could easily be extended to at least 100% for private aircraft engines and propellers, especially when hangared in the majority of time, even if operated under IFR.

Calendar TBO extension would typically not be required for training activities, since such aircrafts typically fly more than 200 hours per year and would normally not reach the calendar limitation. But such aircrafts could easily extend their hour TBO's since such aircrafts fly very often and are very closely supervised.

As with most aggravations of rules, the very basic question is why the aggravation shall be necessary. Do statistics exist which demonstrate a significant higher number of incidents/accidents with calendar TBO extensions of IFR-aircrafts compared to VFR-aircrafts? Do statistics exist which demonstrate a significant higher number of incidents/accidents with hour TBO extensions of flight-training-aircrafts compared to other aircrafts?

In order to safeguard the general aviation and in order to stop the rapid decrease in the number of private pilots, no rules shall be aggravated if no direct safety benefit can be proven. Steadily increasing the costs of flying has detrimental effects, such as, reduced number of student pilots (e.g. young people = next generation pilots), reduced training of active pilots, abandon of flying, sale of the aircraft, reduced income for airfields (e.g. landing taxes), etc. A shift back from IFR- to VFR-flights, would statistically increase the number of accidents. This should also be taken into account, if costs are unnecessarily driven up by the rulemakers.

Stefan Freudiger, Bündackerstr. 67, 3047 Bremgarten

response *Partially accepted*

For IFR flights, only the IFR linked equipment is not considered to be qualified for TBO extension as its failure could seriously impact the continuation of flight in IMC.

Concerning the pre-flight checks, please refer to the response to comment 49.

Concerning the calendar limits please refer to response to comment 67.

The aim of this AMC is to introduce the uniform and approach for general aviation aircraft. With its adoption, more flexibility is given to the owners of concerned aircraft, allowing them to benefit from the application of condition centred

maintenance elements. In addition, this NPA is proposing to apply on extension of components' TBO on the non-complex piston engine and non-powered aircraft taking into the account the , balanced approach that is believed to provide for a level playing field and to introduce the common practices in all Member States. For the training activities please refer to the response to comment No 11 above.

comment 15

comment by: *Aviomar*

There is a contradiction between para. 3 (a) and para 9.1 (Page 6).
 In para. 9.1 the applicability of the decision is limited to aircraft not used for commercial air transport, instead, in para. 3(a), the applicability is limited also to aircraft not used in training activity and IFR operations.
 In our opinion, flight training activity is less heavy/stressing for the aircraft than aerial work activities (for example Aerial Banner Towing). In fact, aircraft operating under an FTO for example, are normally operated in a very controlled and standardized environment where operating standards are approved and at the highest levels. This does not happen for example in aerial work operations where some authorities do not require a formal operational approval although operations such as banner towing regularly take place at very low altitudes and over densely inhabited locations.

response *Partially accepted*

For the training activities please refer to the response to comment No 11.
 The draft NPA was changed to allow the components' TBO extension for the aircraft used for towing activity subject to additional inspections.

comment 16

comment by: *Sylt Air GmbH*

Sehr geehrte Damen und Herren,
 bei der veröffentlichten TBO eines TC Holders handelt es sich um eine **Empfehlung**.
 Etwas anderes kann es auch nicht sein, denn der Hersteller kann den Zustand eines Triebwerkes vor Ort in einem Flugzeug nicht beurteilen. Der Zustand des Triebwerkes kann nur in Sonderprogrammen durch einem 145er Betrieb festgestellt werden. Je nach Einsatzart und Behandlung des Triebwerkes ist der Zustand bei jeder Kontrolle neu zu beurteilen.
 Dies ist auch den TC Holdern bekannt und Lycoming erlaubt eine automatische Verlängerung der TBO um 10 %, wenn das Flugzeug mehr als 480 Stunden im Jahr fliegt und der technische Zustand es zuläßt.
 Jahrzehntlang ist dies bei gewerblichen Unternehmen ohne Sicherheitsbedenken und Unfällen praktiziert worden.
 Eine pauschale Einführung einer bindenden TBO ist nicht nachvollziehbar.
 Ebenso ist die Gewichtsbeschränkung von 2730 kg MTOW und der Hinweis, dass dies für gewerbliche zugelassene Flugzeuge keine Gültigkeit haben soll, nicht nachvollziehbar.
 Es stellt sich die berechnete Frage, warum Großunternehmen wie LH, AF usw. durch Sonderprogramme die TBO ihrer Triebwerke verlängern können und Kleinunternehmen nicht.
 Nach einem Blick in die Unfallstatistiken der BFU usw. stellen wir fest, dass die meisten Triebwerksausfälle bei privat zugelassenen Luftfahrzeugen vorkommen - ist doch die Wartung dieser Maschinen in vielen Fällen fraglich.
 Eine sinnvolle Ergänzung der folgenden Punkte wäre wünschenswert:

	<p>Anhebung der Gewichtsbeschränkung bis 5,7 to oder mehr. Inklusive der gewerblichen Flugzeuge Maximale Verlängerung 20 % der empfohlenen TBO Regelmäßige Sonderprüfungen durch einen 145 er Betrieb, auch bei privat zugelassenen Flugzeugen. Mit freundlichem Gruß Peter Siemiakowski Sylt Air GmbH</p>
response	<p><i>Noted</i></p> <p>Item 1.1.16 of the Appendix I to AMC M.A.302 and AMC M.B.301(b) of Part-M 'Content of the maintenance programme' requires that the intervals at which overhauls and/or replacements by new or overhauled components should be made are mentioned in the AMP. The performance of maintenance in accordance with the maintenance programme is one of the fundamental requirements stated in Part-M.</p> <p>The aim of this AMC is to introduce the uniform and balanced approach for general aviation aircraft maintenance. It is a tool to harmonise a practice applied in EASA Member States.</p> <p>With its adoption, more freedom and flexibility is given to the owners of concerned aircraft, allowing them to benefit from the application of condition centred maintenance elements.</p> <p>Removing the limitation for complex motor-powered aircraft, as well as the MTOW limitation, would create a situation where other limitations e.g. aircraft utilisation, operations and environment could not be justified. The exclusion of certain types of operation and certain categories of the aircraft is based on guidance already applied by some Member-States. During the process of preparation of the NPA in order to determine the scope of the guidance applied, a questionnaire was proposed to the different Member-States. The NPA is the derivative of cumulative data obtained from different approaches used by Member-States.</p> <p>Concerning CAT operators, the highest possible level of flight safety is a prerequisite to obtaining the AOC, and the conditions for operation under a CAT AOC should be proportionate to the complexity of operations and the risk involved, also they should be based on a risk assessment.</p> <p>Besides that, an extension of maintenance tasks is always possible for CAT operators as stated in M.A.302(d)(iii)/AMC M.A.302(d)(7). It would require substantiation data in form of reliability statistics and periodic reviews, which are probably not collected and certainly not conducted/analysed by the most of CAT operators of piston engine non-complex aircraft by default. The ones that do it definitely should be able to benefit from it.</p> <p>Taking into account the provisions of the discussed NPA the CAT operators of non-complex piston engine aircraft will be able to extend certain maintenance tasks if they follow the process applied for the large aircraft excluding the recommended components/engines TBO under the provisions of this AMC#2 M.A.302(d).</p>
comment	<p>19 comment by: <i>British Gliding Association</i></p> <p>Content of the draft decision 9.2...additional precautions. Second bullet point; Competent authorities do not necessarily have experience of a particular aircraft type. CAMO's would be in a better position to make that judgement.</p>
response	<p><i>Not accepted</i></p>

Please refer to the response to comment No 127.

comment	20	comment by: <i>British Gliding Association</i>
	<p>Content of the draft decision 9.2 ...additional precautions. Third bullet point; Excluding TBO extensions on certain types of operation is too restrictive in some cases. Glider towing is an activity where the majority of current aircraft in the UK operate on an engine TBO extension and there is no safety case for restricting this provided the engines are properly operated, maintained and serviced. Excluding towing aircraft from the TBO extensions would have a serious economic impact on operators and clubs.</p>	
response	<i>Accepted</i>	
	<p>The draft NPA was changed to allow the components' TBO extension for aircraft used for towing activity subject to additional inspections.</p>	
comment	21	comment by: <i>British Gliding Association</i>
	<p>Content of the draft decision 9.2 ...additional precautions. Fourth bullet point; Restricting installation of a TBO extended component in a different aircraft is too restrictive. The component is in an airworthy condition or if wouldn't be installed. A 20% TBO inspection should be performed on transfer to verify serviceability and to align the maintenance programme.</p>	
response	<i>Not accepted</i>	
	<p>According to AMC#2 M.A.302 (d), the component TBO extension is related to the individual aircraft where it is installed The reason for that is consideration of the environment and conditions at which aircraft was operated. The installation of such component on a different aircraft would create a situation where the organisation/competent authority is obliged to include the extended TBO for that component in the maintenance programme, not having enough justification data for such actions. It is, however, left at the discretion of the NAAs who may accept component interchangeability in case of well-known aircraft.</p>	
comment	22	comment by: <i>British Gliding Association</i>
	<p>AMC#2 M.A.302(d) – Time Between Overhauls 1. Calendar time TBO requirements should be treated differently to operating hours/cycles. With the exception of safety critical items, If a component has reached its calendar TBO limit before its operating hours/cycles or is only subject to a calendar TBO limitation it should be subject to a simple inspection to extend by 20% or if more appropriate 1 year to align with the annual inspection with repeated annual inspections. Justification; 1, Many seat harnesses are in perfect condition on low utilised aircraft when the manufacturers 12 year life is reached. 2, Engines installed in some motor gliders and light aircraft are very low operating hours when they reach a 10, 12 or 15 year life and are perfectly serviceable.</p>	
response	<i>Noted</i>	

Please refer to the response to comment No 67.

comment	<p>23 comment by: <i>British Gliding Association</i></p> <p>AMC#2 M.A.302(d) – Time Between Overhauls 2 g) Safety critical items installed in all aircraft should be limited to two 20% extensions of TBO of operating hours or calendar time whichever occurs first with interim annual inspections. On completion of the second 20% extension the overhaul must be carried out. Examples of Safety Critical Items: Variable Pitch or Constant Speed propellers High pressure vessels such as oxygen or nitrogen cylinders Pyrotechnic devices Ballistic recovery systems and parachutes Rubber components such as flexible hoses Wing or tail plane attachments where identified as lifed items Composite airframe life All other items, including engines should be inspected before TBO then with inspections annually or 50% of the TBO extension whichever occurs first. Examples of non Safety Critical Items: Engines Fixed pitch propellers Seat harnesses Release hooks Justification; Safety critical items should only be allowed a limited TBO extension to preserve an adequate level of safety. Other items should at least be inspected on an annual basis or more frequently if highly utilised to ensure they remain serviceable and reflecting usage.</p>
response	<p><i>Noted</i></p> <p>The proposed conditions are similar to the ones applied in this Draft NPA. The number of TBO extensions is limited by the MTOM and type of operation but not by the type of component. The approach considers practises already applied by the Member-States and is based on the Agency's experience. The life limited parts are not considered for extension in accordance with this NPA. The final number of TBO extensions should be based on engineering judgement and done at discretion of an owner.</p>
comment	<p>24 comment by: <i>British Gliding Association</i></p> <p>AMC#2 M.A.302(d) – Time Between Overhauls 3a) The exclusion of towing aircraft is too restrictive and inappropriate. Many engines used in glider tugs operate well in excess of the stated TBO without problems provided they have been carefully operated and maintained. Consider introducing additional inspections such as Engine Oil Analysis for tug aircraft in addition to the 20% and annual inspections. Justification: BGA has experience of Lycoming engines used in glider tugs operating well in excess of 3500 hours for a 2000 hour manufacturers TBO without major issues. Careful engine management and regular servicing is the key to longevity.</p>
response	<p><i>Accepted</i></p>

The provisions related to towing activities are changed and, as a consequence, TBO extension of components on concerned aircraft is possible subject to additional inspections.

comment 25 comment by: *British Gliding Association*

AMC#2 M.A.302(d) – Time Between Overhauls
3b)

There should be no restriction on installing a TBO extended component in another aircraft. To align the maintenance programme and ensure serviceability a 20% TBO extension inspection should be performed as part of the change over process. Provided the maintenance records are properly documented and the CAMO is advised at the next ARC or in accordance with any controlled environment agreement it should not be necessary to involve the member state of registry.

Justification:

If the serviceable component was airworthy in one aircraft there is no reason why it won't be airworthy in another provided it is installed, inspected and serviced properly.

response *Not accepted*

Please refer to the response to comment No 21.

comment 26 comment by: *British Gliding Association*

GM M.B.301 (c) – Maintenance programme

1. The 100 flying hours or 12 months on a competent authority register restriction to allow an extension of TBO is restrictive and goes against the principal of free movement between member states.

A 20% TBO inspection would be adequate to ensure serviceability on transfer of registration.

Justification:

If the serviceable component was airworthy in one country there is no reason why it won't be airworthy in another provided it is inspected and serviced properly. A 12 month or 100 hours restriction has no relevance to the operation of the part. Some engines, for example, will take many years to reach 100 hours.

response *Not accepted*

Please refer to the response to comment No 21.

comment 27 comment by: *British Gliding Association*

GM M.B.301 (c) – Maintenance programme

2. As the competent authority does not gather light aircraft or sailplane serviceability or defect data it is inappropriate to consider that they have or do not have enough experience of a particular component.

The experience should be considered as community wide not just individual competent authorities. Individual CAMO's would be in the best position to assess their own experience of a particular engine or component.

Only if there is a very good reason why a particular component should not have an extended TBO should it be restricted. This should be published by EASA as an AD or similar and have EU wide applicability.

Justification:

CAMO's, maintenance organisations and individual licensed engineers will have

response	<p>experience of all the types they maintain competent authorities probably will not.</p> <p><i>Not accepted</i></p> <p>The provisions of the GM M.B.301(c)(2) should relate to the general industry service experience. Therefore, they were changed in order to give the NAAs the right to take into account different factors when making a decision, namely to allow the competent authorities to have certain judgement and safeguards against the novel products having not gained sufficient FH/calendar times suitable for safe extensions. This concept is taken from the NAAs' guidance concerning such matters which was already successfully applied.</p>
comment	<p>33 comment by: <i>Adintech, s.r.o.</i></p> <p>In page 10, 3 a I propose to remove "for components linked to IFR operations". This would allow to use the TBO extension for private flights at night in Member States where this must be conducted under IFR (private flights only, the Commercial and Training flights are already removed from this). There is also, to my knowledge, no evidence that private IFR flights with engines operating over TBO limit pose higher safety risk or have higher incident/accident rate in countries where IFR operations over TBO are common occurrence.</p>
response	<p><i>Accepted</i></p> <p>For IFR flights only the IFR linked equipment is not considered to be qualified for TBO extension as its failure could seriously impact the continuation of flight in IMC.</p>
comment	<p>34 comment by: <i>Lycoming Engines</i></p> <p>Attachment #3</p> <p>Company Official</p>
response	<p><i>Noted</i></p> <p>The inspection at the TBO* interval is a precondition for TBO extension. In most cases the calendar interval is dictated by environmental damage that may occur to the component/aircraft, so the NPA, indeed, takes into account the most severe conditions. It cannot consider all the different possibilities for storage/parking conditions. The calendar terms are extended in the same way as the FH limits. The compression checks potentially can demonstrate the degradation of the engine characteristics including, among others, the ones caused by a crack in the combustion chamber and the magnetic paste on the filters may indicate wear or rust from moving parts or cylinder barrels.</p> <p>The owner/operator has to decide whether to apply the extensions for TBO or not. Then, if the decision is taken to extend the TBO, the maintenance programme should be revised to contain the new intervals, the inspection standards/test conditions and the pass-fail criteria, and, should be submitted to the CAMO/NAA for approval afterwards. In any case the final decision on whether to perform the TBO extensions should be based on engineering judgement and taken by an owner/operator.</p> <p>In addition, the FAA already administers even less stringent requirements for non large aircraft in the form of an annual or 100 FH inspection programme. This approach has not shown any negative experience.</p> <p>The extension of the components' TBOs is already prescribed by the DAH in form of a recommendation.</p>

The critical component lives are usually defined in the airworthiness limitations and this NPA does not allow to extend those.
 This NPA is developed for non-powered and piston engine aircraft components installed on other than complex motor-powered aircraft except for the ones installed on aircraft used in commercial air transport or ab-initio training activities. Also, for the components linked to IFR operations and for which normal serviceable condition is affected by the aircraft's utilisation.

comment 40 comment by: René Meier, Europe Air Sports

AMC#2 M.A.302(d)-Time Between Overhauls 2.g)
 We propose to increase to 30% the relevant 20 % figures mentioned in the paragraph.
 Rationale: As Phil Condit of Boeing once set, quality is to be built in, not tested in, safely running products, parts and appliances should not be checked/tested too often as such checks/tests do not automatically contribute to safety, inspections are sufficient. Oil analyses could be used for trend monitoring, this being an inexpensive way of checking the state of the engine widely used in the air transport world.

response *Noted*

Spectrographic oil analysis should be accomplished according to a defined protocol to provide any useful information. There are certain preconditions that should be followed for the accomplishment of an effective spectrographic oil analysis. A single spectrographic oil sample will not provide a high level of useful information if there is no established wear trend data on that specific engine or at least on the same type of engines for comparison.
 In addition, all the other engine inspection and maintenance methods described in the Appendix XIV to AMC#2 M.A.302(d) are taken from the Member States' guidance which has already been applied successfully. Besides that, other effective methods not mentioned in the Appendix could be used too, as long as they are approved as part of the maintenance programme. The corresponding provisions are added to the text of Appendix XIV to AMC#2 M.A.302 (d).
 Concerning the 30 % TBO extensions please refer to the response on bullet 2 of comment No 42.

comment 44 comment by: René Meier, Europe Air Sports

3. Additional considerations:
 a. We do not agree with your statement that TBO extensions should not be considered for components installed in aircraft used in commercial air transport or training activities, linked to IFR operations, to towing or aerobatic flights. We agree, however, that corrosion is another story.
 Rationale: Aircraft engaged in the operations mentioned above are particularly well maintained, inspected, checked. Not to grant TBO extensions to the aircraft best catered for is not a logical step. Normal training and towing ops do not represent extraordinary stress for an engine or an airframe. We therefore wish the two extension periods of 30 % each as proposed by us. Additionally, before each flight standard checks are performed by all PiC, none of them will take-off with any aircraft not fit for the intended flight.

response *Partially accepted*

In CAT operations - the risk should be mitigated because of the possibility of transportation of passengers and flying over highly populated areas.

For IFR flights only the IFR linked equipment is not considered to be qualified for TBO extension, as its failure could seriously impact the continuation of flight in IMC.

The NPA text was changed and now only the ab-initio training is excluded from the TBO extensions, because this is special activity where ensuring of aircraft/component serviceability is vital and failure of a component/system may become critical in certain situation.

Also please refer to the responses to comments No 141 and No 148.

Concerning the 30 % please refer to the response to bullet 2 of comment No 42.

Concerning the pre-flight checks please refer to the response to comment 49 below.

comment 49 comment by: *René Meier, Europe Air Sports*

Based on man-years of maintenance activities undertaken by hundreds of members of our community we place a significant importance on the external appearance of the aircraft we operate.

Rationale: The external appearance of an aircraft is a perfect indicator for maintenance performed, inspections/checks/tests undertaken.

response *Not accepted*

The purpose of the proposed guidance is to extend the TBOs recommended by the DAH. The nature of the overhaul is to disassemble, clean, inspect, repair the component as necessary to reassemble and test in accordance with the maintenance data. The objective of alternative measures described in said AMC is not likely to be reached only through a visual pre-flight inspection.

comment 56 comment by: *Aero-Club of Switzerland*

AMC#2 M.A.302(d)-Time Between Overhauls 2.g)

The Aero-Club of Switzerland proposes to increase the percentage twice from 20 to 30.

Rationale: All aircraft engines are checked before every take-off. Applying oil analyses to monitor engine condition would be a sufficient contribution to find out about the engine's state, a procedure also common within the CAT world. Safely running engines e.g. should not be checked/tested for the sake of the check or the test. Safety will not be increased, only operating costs. We think that our proposal for twice 30 % is a first step in the direction of the ideal "on condition" aircraft maintenance world we live in.

response *Not accepted*

Please refer to the response to comment No 49 above.

Please refer to the response to bullet 2 of comment No 42.

comment 57 comment by: *Aero-Club of Switzerland*

AMC#2 M.A.302(d)-Time Between Overhauls

3. Additional considerations:

a. We do not agree with the consideration presented that TBO extensions should not be considered for the aircraft engaged in the operations stated. We agree, however, with the point corrosion being a different story.

Rationale: Aircraft engaged in commercial ops, in training ops, in towing ops are well catered for. These operations do not put stress on the aircraft, neither on the airframe nor on the engine(s). Before every take-off all relevant points according

	to an AFM will be checked, no PiC will ever take-off with an aircraft not fully serviceable. And it is the PiC who bears the ultimate responsibility for the flight intended.
response	<p><i>Partially accepted</i></p> <p>For the limitations with regards to type of operation and training activities please refer to the response to comment No 141 and 148.</p>
comment	<p>58 comment by: <i>Aero-Club of Switzerland</i></p> <p>AMC#2 M.A.302(d)-Time Between Overhauls 3. Additional considerations: A supplementary one form the Aero-Club of Switzerland: Based on man-years of activities within clubs and looking at privately owned aircraft as well, we think that besides flight-hours based TBO's, or TBO's based on calendars, the external appearance of an aircraft also is perfect possibility to judge it's general state.</p>
response	<p><i>Not accepted</i></p> <p>Please refer to the response to comment No 49.</p>
comment	<p>66 comment by: <i>SVFB/SAMA</i></p> <p>The one who should make this decision is the owner, together with the organisations whom physically maintains the aircraft regularly.</p> <p>The authority should have data available of the European fleet to understand if there are findings who would prevent an extension and make this information available to the owner/maintainer.</p> <p>This only if the data acquisition, storage and distribution is providing value added. This means, the cost of this data plus all other admin costs must be considerably less than an overhaul without extension. Finally the cost the the operator must be equal or less. Otherwise the overhaul at the recommended interval would be the better solution.</p>
response	<p><i>Noted</i></p> <p>The owner has to decide whether to apply the extensions for TBO or not. If the decision is taken to extend the TBO, the maintenance programme consisting the new intervals, the inspection standards/test conditions and the pass-fail criteria should be submitted to the CAMO/NAA and approved afterwards. Nevertheless, the new NPA 2012-17 'Part-M General Aviation Task Force (Phase I)' is published, giving a privilege to manage and approve the maintenance programme for ELA2 aircraft to a Part-145/M.A. Subpart F maintenance organisations. Occurrence reporting obligations apply and the case of unsafe condition that could spread on the other aircraft of the same type shall lead to issuance of the airworthiness directive by the Agency.</p>
comment	<p>69 comment by: <i>Irish Aviation Authority</i></p> <p>AMC#2 M.A.302(d) – Para 1. It is a concern that this AMC may elevate that status of Service Bulletins, Service Information Letters, Service Leaflets etc, to the status of 'mandatory.'</p>

This requirement may dilute the perceived importance of Airworthiness Directives and Airworthiness Limitation Items, which are mandatory. This AMC increases the gap between the EU system and the US system; where pilot-owners are only mandated to comply with an Annual Type Inspection, Airworthiness Directives and tasks listed in the Airworthiness Limitation Section of a Maintenance Manual. Manufacturers may derive the TBO of a component based on many factors e.g. safety, economic, operational and others, as is mentioned in the NPA. The pilot-owner should review SBs, SILs, SLs etc, for applicability to their aircraft and decide when or if they should be applied. Excessive maintenance may prove to be a waste of money for the pilot-owner, or, possibly, induce a problem where one didn't previously exist.

Para 2. (a) Further clarification as to the level of inspection/test to be carried out is required. Is this to Service Manual or Component Maintenance Manual level? May the units remain fitted for the inspection?

(a) A definition for 'appropriately rated organisation' should be given in this section.

(c) The term 'should' perhaps should be replaced by 'shall' to ensure compliance and to standardise taxonomy.

(d) "All component parts identified by the DAH for replacement at TBO* should be inspected" – does this include disassembling magnetos that may be due overhaul at TBO of an engine?

(f) The requirement for ADs to be completed should also include ALIs.

response

Partially accepted

The service documents related to TBOs are only the means to indicate those. For many aircraft types the TBO are mentioned in Engine Repair/Maintenance Manuals or CMMs. At the same time, there is a difference between the optional modification e.g. the footboard installation on a helicopter and the service document containing the TBO.

As per M.A.301(7), the embodiment police for non-mandatory modifications or inspections is only required to be established for large aircraft or aircraft used for CAT.

The appropriately rated organisation is the organisation having the rating in the approval schedule for maintaining the concerned component. The corresponding provision was added to the text of AMC.

The term 'should' has been already applied in the current AMC to Part-M.

The provision of 2(d) of the AMC#2 M.A.302 (d) refers to the component's parts, meaning the component for which TBO is extended may be disassembled but not its parts or accessories. Also please refer to the response to comment No 2.

ALI affected components are not covered by this AMC, as stated in the 1st paragraph of clause 2.

comment

75

comment by: *MecaNair SA*

2d & 2e / The Part 145 will have to assume a responsibility in case of imperfection of the component because the manufacturer can not be any more responsible as soon as we extend a TBO.

When establishing a report the Part 145 commit his responsibility as the manufacturer considers that his component does not answer any more its criteria of homologation.

Part 145 does not arrange skills superior to the manufacturer to assure that the component is still reliable, to prolong a TBO means clearly the presence of a risk and this risk must be completely accepted by the operator because it is the author

	<p>of this situation.</p> <p>Indeed the operator honestly will always be agreement to delay a financial investment but in case of problem he will remove all sense of responsibility by arguing to have no necessary technical skills to estimate this risk.</p>
response	<p><i>Noted</i></p> <p>In accordance with provisions of AMC#2 M.A.302(d)(2)(a), the components should be checked against DAH maintenance data by appropriately rated organisation. This is the regular task in means of the component maintenance. In addition to that, the parameters, test conditions and pass-fail criteria provided by the DAH should be stated in AMP. That will protect AMO from the personal judgement of operator/owner. The AMO is only responsible for performing the inspection adequately and for proper recording of the detected findings.</p>
comment	<p>77 comment by: <i>Luftsport Verband Bayern / Germany</i></p> <p>2nd paragraph: To whom may the proposal for different intervals be made?</p>
response	<p><i>Noted</i></p> <p>The proposal is to be made to the NAA/CAMO approving the maintenance programme. The corresponding provisions of this AMC are changed to provide a clear statement that indirect approval can be applied in this case.</p>
comment	<p>78 comment by: <i>Luftfahrt-Bundesamt</i></p> <p>I. Zum AMC#2 M.A.302 Das AMC#2 M.A.302 (d) deckt sich im Großen und Ganzen mit dem vom LBA praktizierten Verfahren in den gen. IHP. Es muss ausdrücklich darauf hingewiesen werden, dass keine Unfallgründe von D-registrierten Lfz. vorliegen, die auf die Überziehung der TBO zurückzuführen sind. Da das Thema „Überziehung der TBO“ schon seit Jahrzehnten aktuell ist, wurden diesbezügliche Rückfragen bei der BFU (vormals FUS) immer gleich beantwortet, nämlich dass die Unfallursachen nicht in der Überziehung der TBO zu suchen sind. Diese Aussage hat letztendlich das LBA dazu bewogen, die TBO für nicht verbindlich zu erklären, wie es auch dieses AMC vorsieht. Allerdings wird in Deutschland keine Grenze bei 2.730 kg MTOM gezogen. Es ist aber zu überlegen, ob hier nicht wie im M.A.302 e) gefordert auf die speziellen Betriebsbedingungen eingegangen werden muss. Das NPA unterscheidet in nicht-gewerblichen Einsatz und gewerblichen Einsatz einschl. Ausbildung. Auch dies deckt sich in etwa mit den in Deutschland vorhandenen Verfahren. Wir befürworten aber eine weitere Unterscheidung im nicht-gewerblichen Betrieb hinsichtlich der Kategorie der Lfz. A. nicht motorgetriebene Lfz. 1. Segelflugzeuge In Segelflugzeugen sind nur wenige Komponenten eingebaut, die mit einer TBO behaftet sind: Diverse Instrumente, die nach bestimmten Jahren einem Bench-Test unterzogen werden sollten. Das LBA lässt hier einen großen Spielraum zu, weil eine ungenaue Anzeige nicht zu einer gefährlichen Situation führt. Kupplungen sollten alle 4 Jahre einer Grundüberholung unterzogen werden, was aber auf einer Empfehlung des Herstellers beruht und nicht bindend ist. Allerdings</p>

wird das „life-limit“ eines Bauteils auf 2.000 Starts beschränkt und ist bindend. Die TBO der Gurte und die der evtl. eingebauten Säcke für Wasserballast werden ebenfalls flexibel behandelt.

2. Ballone

In Ballonen sind neben den unter 1. beschriebenen Instrumenten keine TBO behafteten Komponenten verbaut. Die Gasflaschen für die Brenner unterliegen noch anderen Vorschriften und werden konsequent beachtet.

B. motorisierte Lfz.

1. nichteigenstartfähiges Segelflugzeug mit Hilfsmotor

Neben den unter A. 1. beschriebenen Komponenten kommen hier die Motoren und Propeller in Zukunft auch Turbinen hinzu. Ein Ausfall des Antriebs ist nicht kritisch, weil jeder Luftfahrzeugführer sich dessen bewusst ist. Zum einen wird in den entsprechenden Handbüchern darauf hingewiesen und zum anderen verhält sich das Lfz. dann wie ein leistungschwaches Segelflugzeug, was aber vom Piloten gehandhabt werden kann.

2. eigenstartfähiges Segelflugzeug mit Hilfsmotor

Im Prinzip gilt hier das Gleiche wie unter B.1. Zwar führt ein Ausfall des Motors während des Starts zu einer Startunterbrechung, aber diese Situation ist mit einem Seilriss beim Windenstart zu vergleichen und wird von den Piloten beherrscht.

3. Heißluft-Luftschiff

Ein Heißluft-Luftschiff wird in Deutschland wie ein Heißluftballon behandelt, weil sein Betrieb witterungsmäßig stark eingeschränkt ist. Ein Ausfall des Motors führt hier ebenfalls nicht zu einem übermäßig kritischen Zustand.

Aus dem geschilderten Betrieb und Konsequenzen heraus, sollte für die bis hier aufgezählten Lfz. keine übermäßig komplizierte Dokumentation der TBO und Prüfung der entsprechenden Teile erfolgen, sondern ein Betrieb auf der Basis „on condition“ gestattet sein.

4. Reisemotorsegler

Die unterschiedlichen Konstruktionen bei diesen Geräten führt zu unterschiedlichen Einsatzspektren. Vom ähnlichen Betrieb wie Segelflugzeuge bis hin zum Schleppen von Segelflugzeugen ist alles vertreten. Hier sollte dem Einsatzzweck Rechnung getragen werden.

5. Flugzeuge, die nicht „groß“ sind

Auch hier gilt das unter B.4 gesagte, wobei zusätzlich evtl. IFR und Nachtflug hinzukommen kann. Deshalb muss dem Einsatzzweck und der damit verbundenen Überwachung der TBO Zeiten ein individueller Blickpunkt gewidmet werden. Dazu können bei „höherwertigem“ Betrieb die im AMC gemachten Vorschläge sinnvoll sein. Bei reiner „Spaßfliegerei“ ohne erweitertem Einsatz wie Schleppen, Kunstflug, CVFR, Nachtflug und IFR ist eine Beschränkung auf 2.730 kg o. darunter nicht sinnvoll.

Wie hier geschildert, deckt sich unsere Meinung fast mit dem vorgeschlagenen AMC. Eine weitere Unterscheidung sollte allerdings unserer Meinung nach auch für die Ausbildung von Piloten geschehen. Werden A.1, A.2, B.1, B.2 und B.3 Lfz. in der Ausbildung eingesetzt, könnte auch in diesen Fällen einer TBO Überschreitung zugestimmt werden.

response

Noted

These AMC was drafted using the guidance and approaches already implemented by some Member States' NAAs, where the existing practice is that for certain types of piston engine aircraft the TBO extensions are not applied.

During the process of preparation of the NPA in order to determine the scope of the guidance applied, the questionnaire was proposed to the different Member States. The resulting text is the derivative of cumulative data obtained based on different approaches applied by Member States.

Concerning the CAT operators, the highest possible level of flight safety is

prerequisite to obtaining the AOC and the conditions for operation under the CAT AOC should be proportionate to the complexity of operations and the risk involved, also they should be based on a risk assessment.

Besides that, an extension of maintenance tasks is always possible for CAT operators as stated in M.A.302(d)(iii)/AMC M.A.302(d)(7). It would require the substantiation data in form of reliability statistics and periodic reviews, which are probably not collected and certainly not conducted/analysed by the most of CAT operators of non-complex piston engine aircraft by default. The operators that apply the reliability analysis definitely should be able to benefit from it.

Taking into account the provisions of the discussed NPA, the CAT operators of non-complex piston engine aircraft will be able to extent certain maintenance tasks if they follow the process applied for the large aircraft excluding the recommended components/engines TBO under the provisions of AMC#2 M.A.302(d). Nevertheless, some limitations were alleviated during the process of preparation of this CRD, such as towing, training and operation in corrosive environment.

comment	84	comment by: <i>Light Aircraft Association UK</i>
	<p>AMC #2 MA302(d), paragraph 3.a.</p> <p>We feel that it is unduly restrictive to advise a blanket ban on extending TBOs on tug or aerobatic aircraft. There should be a mechanism for allowing an extension to TBOs given sufficient justification. For instance, the owner/CAMO might specify an increased inspection regime to mitigate the higher power use of an engine in such circumstances, e.g. at $((TBO^{**}-TBO^*)/3)$ or $((TBO^{**}-TBO^*)/4)$. There might be other justifications that could successfully be put forward.</p>	
response	<p><i>Partially accepted</i></p> <p>Please refer to the response to comment No 141. The exclusion on towing, corrosive environment operation and training has been alleviated.</p>	
comment	89	comment by: <i>CAA-NL</i>
response	<i>Noted</i>	
comment	90	comment by: <i>CAA-NL</i>
	<p>On item 4: The NPA gives the possibility for on-condition maintenance only if the condition monitoring starts at the beginning of the components life. CAA-NL is of the opinion that a later start is possible but under the condition that a certain number of condition checks have been performed before the TBO is reached. CAA-NL suggest to include a minimum of 6 condition checks to be performed before the TBO is reached to start data collection for trend monitoring. For Engines we suggest a interval of at least 50 to 100 hours in between the checks.</p>	
response	<p><i>Accepted</i></p> <p>Please refer to the paragraph 2 of response to comment No 143.</p>	
comment	95	comment by: <i>UK CAA</i>
	<p>Page No: 10 Paragraph No: AMC#2 M.A.302(d) Time Between Overhauls</p>	

	<p>Comment: Paragraph 3, Additional Considerations states: <i>"TBO extensions in accordance with this AMC#2 should not be considered for components installed in aircraft used in commercial air transport or training activities, for components linked to IFR operations and for components for which their normal serviceable condition could be affected because of the aircraft's utilisation/typical environment (e.g. engine on an aircraft used for towing or aerobatic flights or components affected by the operation of the aircraft in highly corrosive environment)."</i></p> <p>The draft AMC permits 2 or more maximum 20% of OEM TBO life extensions permitted on private category aircraft only. Para 3 under additional considerations does not allow any extensions for piston engined aircraft <2730 kg involved in commercial air transport, training, glider towing or aerial work. For this category of aircraft it is proposed that TBO extensions be permitted but limited to a maximum of 1 x 20% of the OEM recommended TBO life extension.</p> <p>Justification: There has been satisfactory UK industry experience of this period of extension permitted for this category of aircraft over several decades. Also, adoption of the NPA proposals would immediately mean non-compliance for certain aircraft categories in the UK.</p>
response	<p><i>Partially accepted</i></p> <p>For the limitations on the types of operation, please refer to the response to comment No 141. The exclusion on towing, corrosive environment operation and training has been alleviated.</p> <p>Concerning the existing aircraft with extended TBO not falling under the criteria of this NPA please refer to the response to comment No 13.</p>
comment	<p>100 comment by: <i>Kempen Aircraft Maintenance BV</i></p> <p>AMC#2 M.A.302 (d) – Times Between Overhauls. 3. Additional considerations. (a) TBO extensions in accordance with this AMC#2 should not be considered for components installed in Aircraft used in Commercial air transport or Training activities,"</p> <p>Kempen Aircraft Maintenance (KAM) NL.MG.8185 / NL.145.1185 is maintaining +/- 60 Aircraft which vary from Type PC-12 / PC-12/47 // TBM 700 / TBM 850 down to group #5 #6 #10 Aircraft.</p> <p>KAM is operating for many years Group #6 aircraft for pilot training of which the Engines are operating on an on-condition maintenance program.</p> <p>The on-condition maintenance program for our engines was developed and approved by the NL-CAA.</p> <p>Furthermore KAM participated in a working group together with other MRO's which advised the NL-CAA during the development and issuing of NL-CAA / (MD) NL-2011-002.</p> <p>Over the past year's we have never been confronted with off airport landings related to engines which are running on our developed on-condition maintenance program.</p> <p>Although asked, we have never received safety analysis data from the Dutch Airworthiness Authorities which justifies and supports the intention, as is written in EASA NPA 2011-15, to exclude Aircraft used for training related to running engines on an on-condition maintenance program.</p> <p>We therefore see no reason to exclude training Aircraft (MTOM of 2 730 kg or below) from the possibility to extend the overhaul in relation with an on-condition maintenance program as proposed in new AMC #2 M.A.302(d) – Time between overhaul.</p> <p>To illustrate our case I have enclosed a summary list which shows our experience</p>

response	<p>of operating our training aircraft when on an on-condition maintenance program. Our on-condition maintenance program is based on the inspection tasks which results in an in-time Engine repair and/or overhaul. This is and should be the main purpose of, and in-line with, the philosophy of an on-condition maintenance program.</p> <p>To our experience more restriction by EASA regulation will not improve the safe operation of engines which are installed on Aircraft with a MTOM of 2 730 kg or below. It will only increase it's operational cost.</p> <p><i>Noted</i></p> <p>The text of NPA was changed and now only the ab initio training is excluded from the TBO extensions, because this is special activity where the ensuring of aircraft/component serviceability is vital and the failure of any component/system may become critical at certain situation.</p> <p>Further, for limitation on different types of operation and trend monitoring, please refer to the responses to comments No 142 and No 143.</p> <p>The aim of the implementation of this AMC is to introduce the uniform approach for general aviation. With its adoption more flexibility is given to the owners of concerned aircraft, allowing them to benefit from the application of condition centred maintenance elements.</p> <p>In addition this NPA is proposing to apply on extension of components' TBO on the non-complex piston engine and non-powered aircraft taking into the account the balanced approach which is believed to provide for a level playing field and to introduce the common practices in all Member States.</p> <p>Concerning the existing aircraft with extended TBO not falling under the criteria of this NPA, please refer to the response to comment No 13.</p>
comment	<p><i>107</i> comment by: <i>Air Technology Belgium</i></p> <p>Maybe this is problem specific for Robinson Helicopters.</p> <p>TBOs included in the Airworthiness Limitations section cannot be deviated from. For Robinson Helicopters, the TBOs are not included in the airworthiness Limitations so this means that we could apply for the TBO extension. However, Robinson Helicopter Company has included the 2200-hour and 12-year inspections in the Scheduled Maintenance Section.</p> <p>It becomes even more complex as Robinson Helicopter Company notes in the 12-years inspection "comply with Lycoming SI 1009 (TBO recommendations)" and in the 2200-hours Robinson notes "comply as required with SI 1009"</p> <p>By most NAA's there is no escalation possible for scheduled maintenance. This is also a major problem for us as some NAA's give priority to the scheduled maintenance and hereby makes the TBO mandatory, other NAA's give priority to the fact that the TBO has to be seen as a non-mandatory recommendation. This means that we have some EASA countries where the Robinsons have a strict 2000-Hrs/12-years limit for the TBO and in other EASA countries there is no TBO limit at all.</p> <p>Unless some countries wants to see a huge expansion of Robinson helicopters on their register, some standardisation that leaves no more room for interpretation would be a good idea</p>
response	<p><i>Noted</i></p> <p>According to the proposed AMC the extension of TBO is possible for the engine of the Robinson Helicopter R44. Depending on the helicopter application, the engine</p>

can be extended 2 times for commercial operation except for ab initio training and aerobatic flights that could influence the engine performance. For privately operated helicopters there is no limit for the number of extensions.

comment

108 comment by: *Swedish Transport Agency, Civil Aviation Department (Transportstyrelsen, Luftfartsavdelningen)*

· NPA AMC#2 M.A.302 (d)(3)(a)

The NPA contains restrictions for some operational areas that gives room for interpretation by the NAA's.

- How is "training activities" defined?
- Why should certain areas of operation be restricted?
- o We propose that the extension possibilities should be uniform for all non CMPA used in non-CAT operations.
- o Is the intension to forbid the extension possibilities for CAT by this AMC? It can be interpreted in that way.

· NPA AMC#2 M.A.302 (d)(2)(g)

Contains a complex text concerning calculations of the inspection intervals.

o Why a 20% TBO extension when the next "conclusive inspection" has to be performed at 10%?

o We propose an easier and simpler procedure with conclusive extension inspections at 10% intervals up to the maximum permitted extension, per operational area.

- Unlimited number of extensions for
 - private operation and
 - CCO Non-CAT VFR and
 - Flight Training VFR.
- A maximum of 40% TBO-DAH for CCO non-CAT operation.

· Proposal:

Aircraft	Non-CMPA · Non-powered · Piston engine	Non-CMPA · Non-powered · Piston engine
Operational area	· Private · *CCO Non-CAT VFR · Flight Training VFR	*CCO Non-CAT
Limitation of extensions	Unlimited in 10% intervals	Max 40% in 10% intervals

*CCO Non-CAT = Holders of certificate for commercial operations, other than commercial air transport.

· Current M.A.302(d)(iii) and AMC M.A.302(d)(7) bullet one, does not permit escalation by a CAMO.

o Needs to be amended to reflect the intended AMC.

· NPA AMC#2 M.A.302 (d)(2)(j)

Change final sentence to:

o Alternatively, the maintenance programme may be approved in accordance with the M.A.302 (c) indirect approval procedure for all non CMPA and non-CAT operated aircraft.

· NPA AMC#2 M.A.302 (d)(2)(a)

What does "appropriately rated organisation" mean in this case? Airframe and/or component rating per Part-145/Part-MF/Part-66?

o What is the purpose of mentioning "appropriately rated organisation" here? Is this not already made clear in the current M.A.502 and M.A.802?

response *Partially accepted*

The text of NPA was changed and, in the present draft, only the ab initio training is excluded from the TBO extensions, because this is special activity where the ensuring of aircraft/component serviceability is vital and failure of any component/system may become critical at certain situation even if it can happen at very remote probability.

The training activities have not been defined by this AMC.

Further, please refer to the response to comments No 141, 142 and 13.

The figure of 20 % was taken based on the guidance applied by some NAAs.

The provisions of AMC#2 M.A.302 (d)(2)(g) were changed to include the possibility for indirect approval of maintenance programme with extended TBOs.

Also, please refer to the response to comment No 117 below.

For the 'appropriately rated organisation' please refer to the response to comment No 8.

comment *111*

comment by: *BCAA*

One of the purposes of the NPA is to harmonise the approach of TBO extension for component overhaul.

One of the first important aspect to be taken into account in the way of a standardisation is the harmonisation of the record system of the Time In Service (TIS) of the components.

The TIS can be recorded according to different principles:

- block-block (as foreseen in the general aviation),
- flight time (takeoff-landing),
- engine oil pressure switch (engine on-off),
- engine RPM.
- electrical battery master switch,

According to the record system one hour recorded can varies from 0,8 to 1,2 real hour on the clock.

Proposal: a clear definition of TIS.

response *Noted*

The issue of counting of the time in service unfortunately cannot be addressed in this NPA, because it might require some changes to the existing regulations. Also, in most of the cases, it is defined by the DAH.

comment *112*

comment by: *BCAA*

AMC#2 M.A. 302(d) 2.f): "AD required to be completed at the time of overhaul should be completed not later than TBO".

There is no advantage to offer the possibility of TBO extension if an AD requiring a complex intervention on a component (ex. an opening of the engine) remains to be completed at the original time of overhaul.

Such intervention for the compliance of an AD will conduct to the performance of

response	<p>the overhaul of the concerned component because the financial aspect of the intervention. Ex. FAA AD 94-05-05 R1 (TCM): Rocker shaft bosses inspection (FPI) on C90 and O-200 engines. FAA AD 97-26-17 (TCM): Inspection (ultrasonic) of the crankshaft on O/IO 360 and 520 engines. FAA AD 2009-26-12 (ECI): Replacement of some types of cylinders "not later than 2000hrs after effective date of the AD.</p> <p><i>Not accepted</i></p> <p>The accomplishment of the Airworthiness Directive is stipulated by the found on the aircraft unsafe condition arising of deficiency of aircraft, engine, component. The AD itself implements either corrective action or inspection that should determine the signs of such condition and prevent the consequences accordingly.</p>
comment	<p>113 comment by: BCAA</p> <p>§ 4 of the NPA: ...<i>"The maintenance programme should identify additional flight hours and/or calendar time inspections required when exceeding the originally recommended TBO..."</i> and AMC#2 M.A. 302(g) ...<i>"together with any additional maintenance action identified as necessary"</i></p> <p>Are additional inspections mandatory when the originally recommended TBO is exceeded or does remain the original inspection program of the DAH/TCDS holder acceptable?</p> <p>What's happens if after an inspection when the originally recommended TBO is exceeded and the original TBO has been extended, it's appear necessary to perform repair or corrective action on the component. Are repair or corrective action authorised or does the occurrence of such need of repair or corrective action cancels the extension of the TBO?</p>
response	<p><i>Noted</i></p> <p>The purpose of this AMC is to permit to extend the TBO provided that inspections are performed. The decision on whether to extend TBO should be taken prior to moment of accomplishment of the overhaul. Nevertheless, at any time, engines could be subject to overhaul.</p> <p>If the original DAH programme recommends to accomplish an overhaul and the overhaul, for any reason, is chosen not to be performed, then the inspection, prescribed by the AMC becomes mandatory. AMC#2 M.A. 302(d)(2)(g) refers to the situation when first of all 'the inspection results are satisfactory and there is no reason to believe that component will not function as intended the TBO^E will be reflected in the aircraft maintenance program together with any additional maintenance action identified as necessary', meaning of cause minor maintenance like tuning or tighten up etc. Nevertheless, if any deficiencies are found during the TBO* inspection which relate to the condition of the engine, the engine should be sent to the overhaul and the further interval extensions should be adjusted correspondingly.</p>
comment	<p>114 comment by: BCAA</p> <p>AMC#2 M.A. 302(d) 1:...<i>TBO's included in the Airworthiness Limitations Section ...cannot be deviated from.</i></p> <p>The TBO are recommended in the publications of the DAH of the component.</p>

response	<p>Several approaches are found in the section 4 of the maintenance manual of the TC holder of the A/C. Ex. In the Cirrus maintenance manual it's mentioned that "there is no life limitation" on the engine or the propeller. In the maintenance manual of Socata TB20 it's mentioned "refer to the maintenance manual Avco Lycoming " or "refer to SL N° 61 Hartzell". For Socata, the data contained in the publication of the DAH of the engine and propeller seems to be considered as an airworthiness limitation. For Cirrus these data are not defined as airworthiness limitation. Suggestion to write "<i>TBO's included in the Airworthiness Limitations Section of the publication of the DAH of the component</i>"</p>
	<p><i>Not accepted</i></p> <p>The reference for the TBO differs from one DAH to another, in some cases the aircraft maintenance manual is a document that would indicate the mandatory status. Based on that reason the current wording is believed to be more appropriate.</p>
comment	<p>117 comment by: AESA (SPAIN)</p> <p><u>Comment 2</u> AMC#2 M.A.302 (d) — Time Between Overhauls 2. j) Based on the results of the inspection, the aircraft maintenance programme updates containing TBO extensions should be approved by the competent authority. Alternatively, the maintenance programme may be approved in accordance with the M.A.302 (c) indirect approval procedure for privately operated aircraft with a MTOM of 2 730 kg or below. Justification: It is not fully clear the intention of the last expression of this paragraph, that is: if indirect approval is permitted only for privately operated aircraft with MTOM below 2 730 kg after the second extension or not. In AESA's opinion, the indirect approval should be permitted regardless of the extension number and the type of operation.</p>
response	<p><i>Partially accepted</i></p> <p>This paragraph has been changed. The indirect approval is seen as an option for any number of extension. That is the reason why this provision is placed at the end of the paragraph. In relation to the types of the operation it is believed that aircraft with MTOM>2730 kg and the ones involved in commercial operation should be subject to direct approval based on practises already applied by the some Member States.</p>
comment	<p>118 comment by: AESA (SPAIN)</p> <p><u>Comment 3</u> AMC#2 M.A.302 (d) — Time Between Overhauls 3. Additional considerations: a. TBO extensions in accordance with this AMC#2 should not be considered for components installed in aircraft used in commercial air transport or training activities and local flights,... Justification:</p>

response	<p>1 – It is proposed to delete (in accordance with this AMC#2) in order to avoid the development of other different AMC or the continuance of existing different approaches in European countries for the scope not covered by this paragraph (Commercial air transport or aerial work). With the current text, it can be understood that, for example, existing national policies of extensions of TBO limits for aircraft involved in training activities can still be used.</p> <p>2. – It should be considered to extend the limitation established by this paragraph to aerial work; at least local, flight activities must also be included in this limitation.</p>
	<p><i>Noted</i></p> <p>Please refer to the response to comment No 61.</p>
comment	<p>121 comment by: <i>Konekorhonen Oy 145-org. and G-org.</i></p> <p>We would like to thank you because of this NPA which is heading to right direction and unifies policies on EASA countries.</p> <p>However we would like to point out our opinion on point 3.a. regarding training activities. We think training activity in flight clubs for members should be considered so extension of TBO would be possible according to point 2.g - h.</p> <p>Also towing activity according to point 3.a. should be considered as extendable because otherwise this would have major negative impact on flight clubs glider towing and parachuting flights.</p>
response	<p><i>Partially accepted</i></p> <p>The draft NPA was changed to provide for special conditions for component TBO extension for the aircraft used for towing activity and operation in corrosive environment. Also the training limitation has been alleviated.</p>
comment	<p>123 comment by: <i>DGAC FRANCE</i></p> <p>- <u>General Comment:</u> Scope of the equipment concerned:</p> <p>The regulation basically includes the principle permitting TBO extension for all types of equipment, based on justifications/alternative maintenance actions accepted by the Authority.</p> <p>The interest of the NPA is to standardize practices amongst Authorities by proposing acceptable alternative maintenance actions to the TBO. However the NPA only contains technical instructions for piston engines. For all other equipments (propeller, magneto etc.), the NPA does not provide any technical directions, therefore the situation will remain the same, whereby some Authorities will accept TBO extensions and others will not, on account of a lack of standardized technical criteria.</p> <p>Therefore, DGAC France would appreciate the broadening of Appendix 14 to other equipments.</p> <p>- <u>Comments on AMC#2 MA302(d):</u> Type of inspections and expected efficiency: AMC# MA302(d) - b) & Appendix 14</p> <p>DGAC France believes that inspection methods can be proposed to reasonably detect the corrosion in the engine (detailed visual inspection after cylinder removal and/or borescope examination). Therefore, DGAC France believes that an</p>

unlimited extension of the calendar TBO can be considered in all cases. DGAC France believes that extension above 120% of FH TBO should not be considered due to hour driven issues, in particular fatigue faults on crankshafts, casings etc, as they are more difficult to identify. Furthermore, given DGAC France current national policy with respect to TBO extension, we consider our feedback on the "extension envelope" as proposed above, to be sufficient and satisfactory for Continental and Lycoming engines. Hence, DGAC France's proposal is as follows:

Engine applicability:

- Continental piston engines

- Lycoming piston engines

Calendar TBO extension: AMC# MA302(d) - g) h) i) & 3.a

For all aircraft types and operations: Replacement of the TBO by:

- 100FH/1 year classical visual inspection (as in proposed Appendix 14 to AMC M.A.302)

- 3-year in depth corrosion inspection (detailed visual inspection after cylinder removal and/or borescope examination).

FH TBO extension: AMC# MA302(d) - g) h) i) & 3.a

- For aircraft used for aerobatics, towing and skydiving: No extension of the FH TBO is allowed.

- For other aircraft: Extension of the TBO up to 120% of the recommended TBO, with intermediate 100FH/1 year inspection (as in proposed Appendix 14 to AMC M.A.302)

Case of specific types of operations: AMC# MA302(d) - 3.a

For aircraft used in IFR, night VFR, ab initio training, DGAC France believes that they should be eligible to the extensions above, provided the person/organisation performing the extension inspections are adequately supervised by the Authority:

- Approved maintenance organisation, or

- For ELA1 aircraft: Independent certifying staff formally approved by the Authority (same principle as in M.A.901(g))

Formalization of TBO extension AMC# MA302(d) - j)

The process described in the NPA consists of updating the Maintenance Programme, once a satisfactory inspection has been conducted. This implies that only a CAMO or the Authority may grant the extensions. DGAC France considers that it would be more appropriate to have the extension granted "as a normal basis" and the intermediate inspections introduced in the MP. In this way, the CRS would be enough to resume operation. If deemed necessary, Authority's surveillance of the extension process could still be ensured "a posteriori" through receipt of inspection reports.

response *Partially accepted*

This NPA is the first step towards the long awaited process of relaxation of the continuing airworthiness requirements for general aviation. Although, most of guidance proposed by this AMC is dedicated to the piston engine, it provides for other components' TBO extensions. In addition Item 4 of AMC#2 M.A.302(d) – Time Between Overhauls gives a possibility to apply a complete condition monitoring maintenance programme for components, instead of TBO, subject to certain conditions and approval by the competent authority. In addition, the new NPA 2012-17 'Part-M General Aviation Task Force (Phase I)' introduces the

Minimum Inspection Programme (annual/100 FH). Together with the possibility of establishing the self-declared maintenance programme it gives further relief from DAH prescribed maintenance requirements. .

The detailed inspection of the inside engine components should be done if some deficiencies are found during the basic inspections or tests proposed by the Appendix XIV to AMC#2 M.A.302 (d). In abovementioned scenario it would not be possible to extend TBOs in most of the cases. Nevertheless, having an additional corrosion check could be justified for unlimited extensions of piston engine TBOs, but, considering the guidance already applied by some NAAs we believe that internal condition inspection mentioned under clause 3.2 of the Appendix XIV to AMC#2 M.A.302 (d) will serve that purpose as well. An excessive corrosion could be detected by the contamination of the oil and presence of rust in the oil filters. Also, provisions allowing the alternative inspections/tests were added to the text of Appendix XVI to AMC2 M.A.302 (d). Concerning the types of engines, it would be not practical to limit the AMC with the types of engines based on guidance provided by NAAs because different NAAs have different experience with different engines.

The exclusion on towing, corrosive environment operation and training has been alleviated. Also concerning the types of operation please refer to the response to comment No 141.

AMC#2 M.A.302 (d)(2)(j) was amended to provide for approval of the maintenance program by the CAMO - indirect approval. Besides that, even the approval of extended TBO maintenance program in NAA is one time exercise. from which the owner would benefit for a long period of time. Nevertheless, the submission of the inspection results, following the AMP approval, is also foreseen. The provisions prescribed by this AMC provide for approval of the inspection, standards and pass-fail criteria prior to the TBO extension. This would be a first step to get the principal agreement from NAA to start the process.

Besides that, the component installed on the aircraft, having other TBO/maintenance interval than prescribed by the approved maintenance programme, would create a contradiction with existing requirements.

comment	128	comment by: <i>EFLEVA</i>
	AMC#2 M.A.302 (d) — Time Between Overhaul. Section 3a. EFLEVA do not agree with the exclusion of training activities for aircraft with extended TBOs, since for many historic aircraft, there is no alternative training vehicle and there is no evidence that this activity presents a greater risk.	
response	<i>Partially accepted</i>	
	Please refer to the response to comment No 11.	
comment	129	comment by: <i>EFLEVA</i>
	AMC#2 M.A.302 (d) — Time Between Overhaul. Section 3a. Operation of aircraft in highly corrosive environment is not clearly defined. This type of corrosion will, in any case, be identified in an "on- condition" maintenance regime, and therefore there is no need to exclude this type of operation.	
response	<i>Partially accepted</i>	
	The corrosion is taken into account due to possibility of corrosion of inside parts of the engine and because during the operation and parking in highly aggressive corrosion environment, the intervals for the TBO inspections could be too lengthy. The limitation is alleviated. Some compensating measures, like additional	

inspections are added.

comment 130 comment by: EFLEVA

AMC#2 M.A.302 (d) — Time Between Overhaul. Section 3a EFLEVA considers the ban on extension of engines in glider tugs and aerobatic aircraft to be over restrictive. Excessive wear will in any case be identified in an "on- condition" maintenance regime, and therefore there is no need to exclude this type of operation.

response *Partially accepted*

Please refer to the response to comment No 121.

comment 131 comment by: EFLEVA

AMC#2 M.A.302 (d) — Time Between Overhaul. Section 3b EFLEVA considers that the use of engines which are past manufacturers TBO being retrofitted to other airframes is an acceptable practice. A well maintained engine inside the TBO extension period formerly installed in an airframe that was written off due to accident damage can still provide useful service if retrofitted into another aircraft.

response *Not accepted*

Please refer to the response to comment No 21.

comment 140 comment by: WESERTRAINER FLIGHT TRAINING

AMC#2 M.A.302 (d) 2.

g)

When following the classic maintenance approach (no trend monitoring) 20 % extension steps are proportionate but more useful in general would be a extension in hundreds of hours for example 300h. In most cases components follow a maintenance shedule with intervalls of 50h or 100 h. From this point of view a conclusive inspection at 50 % of TBO extension may be dispensable and does not fit in a standard maintenance plan at all. The special inspections suggested by NPA 2011-15 to be carried out at the end and beyond of the recommended TBO have in fact been carried out each 100 hours or annually ever since the aircraft or engine was first placed into service.

h)

please see j)

i)

All engines operated in the general aviation have to achieve the same level of operational safety within and beyond TBO indepent from aircraft utilisation. Otherwise flights of private operated aircraft with engines behind TBO for example over densely populated areas cannot be accepted.

From this point of view, a limitation on privately operated aircraft is dispensable.

j)

Based on capacity experiences made in Germany it is out of touch with reality to apply for approval of an aircraft maintenance programme update at the competent authority every time the extension limit has been reached.

A practical way would be to proceed with standart inspection based on a continous applicable aircraft maintenance programme based on DAH's instructions also beyond TBO added by deeper inspections every time the 300h (or whatever) extension intervall has been completed. We suggest to submit a inspection report to the competent authority. Maybe these reports could be the basis for selecting aircraft for ACAM checks. Following this approach would give the competent authority the capability to check if engines parameters really meet all requirements and to acquire experience on extended engine lifetime.

As mentioned in an other comment we require EASA to focus on harmonized engine trend monitoring programmes and break of the idea of recommended time between overhaul.

response *Noted*

The exclusion and limitation on certain type of operations is aroused from the additional loads on engines as aerobatic flights etc. and also on the conditions - operation in highly corrosive environment. The other issue is CAT operations, for which the risk should be mitigated because of possibility of transportation of the passengers.

The owner/operator can propose the intervals different to the ones prescribed by the extension of TBO to match the existing inspection programme provided that the scope of the inspections is same and the intervals are within the limits of 20 %.

AMC#2 M.A.302 (d)(2)(j) was changed to clarify the possibility of approval of the maintenance program by the CAMO - indirect approval. Besides that, even the approval of an extended TBO maintenance program in a NAA is a one-time exercise from which the owner would benefit for a long period of time. Nevertheless, the submission of the inspection results, following the AMP approval, is also foreseen. Also a component installed on the aircraft having other TBO/maintenance interval then prescribed by the approved maintenance programme would create a strong contradiction with existing requirements. For the trend monitoring issues please refer to the response to comment No 142.

comment 141

comment by: *WESERTRAINER FLIGHT TRAINING*

AMC#2 M.A.302(d) 3.a.

We can't follow EASAs opinion that aircraft utillised in training activities shall be excluded from TBO extensions. Flight training is an utillisation not different from any other .The argument often heard in this context is a need of additional safety for soloflights of students.

All engines operated in the general aviation have to achieve the same level of operational safety within and beyond TBO. Otherwise flights of private operated aircraft with engines behind TBO for example over densely populated areas cannot be accepted.

An obvious statistical decrease in safety cannot be accepted in any operation. Not in flight training and not in private operation. Its a fairy tail to belive there is a statistical benefit in safety between an well maintained engine within TBO an

	<p>beyond TBO.</p> <p>Besides any statistical discussion it is obvious that a student pilot is better trained on emergency procedures than any other pilot in general aviation besides flight instructors.</p> <p>We request EASA to drop this unproportionate limitation.</p>
response	<p><i>Partially accepted</i></p> <p>The exclusion of certain types of operation and some kinds of the aerial works is based on guidance already applied by some NAAs. During the process of preparation of the NPA, in order to determine the scope of the guidance applied, a questionnaire was proposed to the different NAAs. The resulting text is the derivative of cumulative data based on the different approaches applied by Member States.</p> <p>The text of NPA was changed and now only the ab initio training is excluded from the TBO extensions because this is special activity where the ensuring of aircraft/component serviceability is vital and failure of any component/system may become critical at certain situation even if it could happen at very remote probability.</p>
comment	<p>142 comment by: WESERTRAINER FLIGHT TRAINING</p> <p>AMC#2 M.A.302(d) 3.a.</p> <p>We suggest to drop any general exclusion from going beyond TBO for different aircraft utilisations if an trend monitoring programme is applied. Trend monitoring programmes should be independent of recommended TBOs because TBOs follow a different approach in maintenance.</p> <p>Trend monitoring is the superior methode to achive the highest level of safety at any time in service live by continious survillance of all critical parameters. Consequently unlimited operation of engines under trend monitoring shall be allowed until pass-fail criteria are exceeded.</p>
response	<p><i>Not accepted</i></p> <p>For the types of operation please refer to the response to comment No 141 above. The application of trend monitoring for extension of TBOs is always possible and would require substantiation data in form of reliability statistics which is probably not collected and certainly not analysed by the most operators/owners of non-complex piston engine aircraft by default. The operators that apply the reliability analysis definitely should be able to benefit from it.</p> <p>Taking into account the provisions of the discussed NPA, the operators of non-complex piston engine aircraft will be able to extend certain maintenance tasks if they follow the process applied for the large aircraft but not the recommended components/engines TBO under the provisions of AMC#2 M.A.302(d).</p>
comment	<p>143 comment by: WESERTRAINER FLIGHT TRAINING</p> <p>AMC#2 M.A.302 (d) - Time Between Overhauls 4.</p> <p>We appreciate the modern approach to engine maintenance by trend monitoring together with an on condition maintence programme for the whole component service life.</p>

We suggest to extend this approach by a harmonized programme certification by EASA. Part 145 organisations or Part 21 organisations shall be allowed to establish reference programmes for different components (e.g. engines) under different utilisations (e.g. flighttraining) to be approved by EASA or their respective competent national authority. The reference programme shall be applicable within all EASA member states. Under licence agreement these programmes may become part of the individual aircraft maintenance programme approved by the competent authority of the memberstate the aircraft is registered considering the particular circumstances of the aircraft.

An example of a reference programme may be Document TCM-OC, Issue 1, 20-07-2010, established by Vliegwerk van Holland, approved by CAA Netherlands, DE MINISTER VAN VERKEER EN WATERSAAT, Approval VENW/IVW-2010/7535, 19-08-2010

We also suggest to drop the limitation of initializing trend monitoring programmes only at the beginning of component`s service life. For many aircraft with components in good condition switching to trend monitoring programmes would be an increase in safety by high cost efficiency at any time in service life.

The modern trend monitoring approach bringing together an increase in safety with high cost efficiency will go unnoticed in many cases if programme initialization is only possible at the beginning of service life.

response *Partially accepted*

At present time NPA 2012-17 'Part-M General Aviation Task Force (Phase I)' was issued and it proposes some alleviations for ELA1 and in some cases ELA2 aircraft as well. For ELA1 aircraft not involved in commercial operations, it introduces the Minimum Inspection Programme (annual/100 FH), together with the possibility of establishing the self-declared maintenance programme. It also provides for a privilege to a Part-145/M.A. Subpart F maintenance organisations to manage and approve the maintenance programme for ELA2 aircraft. Thus it provides for further relief from current maintenance requirements for mentioned categories of aircraft.

The requirement for trend monitoring of the component from the beginning of its life has been alleviated.

B. Draft Decision - GM M.B.301 (c) – Maintenance programme

p. 10-11

comment 12

comment by: *Maintain a Plane*

2. for aircraft types for which the competent authority considers itself not having enough experience, it may decide not to allow CAMOs to use the indirect approval procedure for the extension of TBOs.

Camo`s should not have their capabilities limited by the lacking experience at authority level, Experience on New or "Excotic" aircraft will be primarily gained by Camo`s and Maintenance personnel, Authorities falling behind in experience should rely on the judgement by those parties who don`t

If this par. persist in this amendment it should be on component level rather than aircraft level, New or "Excotic" aircraft can very well be fitted with components (engines) that have been around since the dawn of aviation, and there should be no reason not to allow for TBO extensions simply because its fitted to a new design

response	<i>Accepted</i> Please refer to the response to comment No 92.
comment	45 comment by: <i>René Meier, Europe Air Sports</i> GM M.B.301(c) Para 1: Please delete this provision! Rationale: Normally aircraft arrive with a TC or an STC, therefore the provision proposed by the Agency is not necessary. We agree with the idea in exceptional cases, but not as a standard measure. We do not follow the arguments, particularly not the one about the "individual aircraft" idea the Agency is writing of.
response	<i>Noted</i> Please refer to the response to bullet 1 of comment No 42.
comment	46 comment by: <i>René Meier, Europe Air Sports</i> GM M.B.301(c) Para 2: Please change this provision! Rationale: It is not the competent authority which needs enough experience, it is the maintenance organisation and the operator. Therefore, if those propose the two 30 % TBO extensions these should be granted, as it is the operator of the aircraft who has to assure at all times the safe operation of the aircraft.
response	<i>Noted</i> Please refer to the response to comment No 42.
comment	59 comment by: <i>Aero-Club of Switzerland</i> GM M.B.301(c) Para 1: We do not support this provision. Rationale: Aircraft arrive with TC or STC, with a complete AFM containing all relevant information and recommendations, therefore the proposed restriction is not needed as a standard solution, it may be a solution for special situations, but in no case for "individual aircraft" of a type already operated by the dozens in all the members states of EASA.
response	<i>Noted</i> Please refer to the response to bullet 1 of comment No 42.
comment	60 comment by: <i>Aero-Club of Switzerland</i> GM M.B.301(c) Para 2: We wish this provision to be changed. Rationale: Not the competent authority needs experience, it is the owner/operator/maintainer to which this fact applies. If the latter propose to increase TBO twice by 30 % these extensions should be granted, based on the experience made by those who operate the aircraft. It always is the operator who is at any time responsible for the safe operation of the aircraft.
response	<i>Not accepted</i>

Please refer to the response to comment No 42.

comment	<p>68 comment by: <i>Danish Powered Flying Union</i></p> <p>GM M.B.301(C-) proposes that the individual aircraft shall fly 100H/12M within the national authority before the extensions of TBO can be granted. We strongly oppose this approach as it is generically a way to restrict the free trade of goods and services within the EU.</p> <p>Having stated this we propose that the information needed for the national authority to determine if a TBO should be extended should be defined and recorded by the part 145 organization maintaining the aircraft. And naturally this maintenance record will be part of the owners documentation.</p>
response	<p><i>Noted</i></p> <p>Please refer to the response to bullet 1 of comment No 42.</p>
comment	<p>73 comment by: <i>Irish Aviation Authority</i></p> <p>AMC#2 M.A.302(d) –</p> <p>Para 2 (g) Is ‘another conclusive inspection’ a second inspection to the same level as described in Para (a), or a different level of inspection?</p> <p>(i) It is noted that the term ‘privately operated’ has not been used previously under 2042/2003. A definition for this should be given.</p> <p>3. (a) “TBO extensions... should not be considered for components installed in aircraft used in CAT.” – This statement, in conjunction with Para 1, may result in operators being mandated to comply with SB’s, SILs and other Manufacturers’ documentation. This may be overly excessive and diminish the function of the reliability monitoring programme. Through reliability monitoring, operators may extend maintenance periods within their current procedures. This AMC may effectively force them to return to Manufacturers’ recommendations regardless of the operating environment or the operator experience available.</p> <p>Additional Note: Provision should be included to address components which have TBOs that are dictated by the TBO of another component (e.g. accessories fitted to an engine).</p> <p>GM M.B.301(c)</p> <ol style="list-style-type: none"> 1. Is it envisaged that a common policy on the import of aircraft into the EU, with installed engines which have exceeded their TBO, will be developed? 2. Should this paragraph be referring to the CAMO’s experience rather than the experience of the Authority?
response	<p><i>Noted</i></p> <p>Para 2 (g) - The same level inspection has been in mind.</p> <p>(i) - Privately operated is just an opposite to CAT operation and commercial operation other than CAT, as it is mentioned by the AMC M.A.803(a).</p> <p>3. (a) - The item 1.1.16 of the Appendix I to AMC M.A.302 and AMC M.B.301(b) of Part-M ‘Content of the maintenance programme’ requires to mention in the AMP the periods at which overhauls and/or replacements by new or overhauled components should be made.</p> <p>Further, please refer to the point 3 of response to comment No 147 and response to comment No 69.</p> <p>Additional Note: Please refer response to comment No 69.</p> <p>GM M.B.301(c)</p>

1. There are no current rulemaking tasks addressing such a policy.
2. Please refer to the response to comment No 92 below.

comment	<p>92</p> <p style="text-align: right;">comment by: CAA-NL</p> <p>CAA-NL suggest to add an item 3.: 'the competent authority may decide to exclude certain components (including engines) to be excluded based on the competent authorities experience.'</p> <p>When looking at the current possibilities in the various EU-MS there are some items or engines specifically excluded from current possibilities to extent TBO's for a safety reason e.g. certain Rotax engines.</p>
response	<p><i>Accepted</i></p> <p>Provision G.M. M.B.301 (c) is changed to address the problem of the components/engines not having enough operational experience.</p>
comment	<p>109</p> <p style="text-align: right;">comment by: Swedish Transport Agency, Civil Aviation Department (Transportstyrelsen, Luftfartsavdelningen)</p> <ul style="list-style-type: none"> · NPA GM M.B.301(c)(1) <p>We consider this to be an unnecessary restriction when transferring aircraft between member states.</p> <ul style="list-style-type: none"> o We propose removal of this paragraph. <p>An assessment of the new and old AMP is necessary to compare the operational use when changing the state of registry. The intent is already taken care of in current M1 and M.A.302.</p> <ul style="list-style-type: none"> · We propose that all aircraft with previously approved TBO extensions according to national regulation are able to continue using these until the limits of these extensions are reached. · All extensions including inspection details shall be recorded in the applicable technical records.
response	<p><i>Not accepted</i></p> <p>The corresponding paragraph is changed to address the general industry service experience and to allow NAAs to decline the proposed extension.</p> <p>The maintenance program approval is at discretion of the new Member State of registry and can be done with extended TBOs.</p> <p>As for the existing aircraft with extended TBO not falling under the criteria of this NPA, it is believed that this AMC is setting the minimal standard and NAAs, based on their experience, should be able to take the decisions on such cases. In no way this NPA has an intent to impose new provisions on the owners and the operators of concerned aircraft retrospectively.</p> <p>The requirements for fulfilment of the technical records are already in the text of the NPA.</p>
comment	<p>120</p> <p style="text-align: right;">comment by: WESERTRAINER FLIGHT TRAINING</p> <p>We suggest to change the limitations in sentence 1. from:</p> <p>the competent authority may decide not to extend the component's TBO when the individual aircraft has been <u>under its register</u>...</p> <p>in</p>

	<p>...under register of a EASA member state...</p> <p>to avoid difficulties for the transfer of aircraft between EASA Member states well know from the todays situation.</p>
response	<p><i>Noted</i></p> <p>Please refer to the response to comment No 109 above.</p>
comment	<p>132 comment by: EFLEVA</p> <p>Page 10 GM M.B.301 (c) item 1 The exclusion of aircraft with less than 12 months on the register or less than 100 flying hours is illogical and should be removed. The extension of TBO is based on DAH and operator experience coupled with the appropriate data recording and analysis, independent of the registration date and flying hours of a particular aircraft. This could also lead to the situation where two examples of the same type with the same maintenance and use background, but different registration dates, will receive different treatment, depending on the date they were put on the register.</p>
response	<p><i>Noted</i></p> <p>These AMCs were drafted using the guidance and taking into account approaches already implemented by some NAAs. This clause is addressing the individual aircraft and it gives the option to NAA not to extent the TBOs. In accordance with current regulations, the State of Registry is responsible for issuance of CofA and approval of the maintenance programme.</p>
comment	<p>134 comment by: EFLEVA</p> <p>GM M.B.301 (c) — Maintenance programme. Page 11 item 2. This limitation should be deleted as per the comment number 127 above on authority experience.</p>
response	<p><i>Not accepted</i></p> <p>Please refer to the response to comment No 127.</p>

B. Draft Decision - Appendix XIV to AMC#2 M.A.302 (d) — Inspection to Time Between Overhauls

p. 11-14

comment	<p>4 comment by: AVAG, Eugenio Lanza di Casalanza</p> <p>Referring to engines, all these procedures, especially those about power output are much more complicated than what is needed, especially for those small engines used on small aircraft under 1000 kg normally not fitted with variable pitch props. An overall condition, leak test and oil pressure test is normally enough to understand if the engine is within his limits, and for the power is enough to reach the recommended static RPM stated on the Airplane Flight Manual. All this is done and registered at each annual so it makes no sense to do complicated tests or else.</p> <p>And more, calendar TBO's makes no sense on the engine's internal, because it may only affect ageing parts like gaskets and hoses fitted on the outside of the engine.</p>
response	<p><i>Noted</i></p>

Please refer to the responses on comments No 82 and 67.
The corrosion has to be taken into account because engines which have flown less than 100 hours a year or irregularly are strong candidates for corrosion formation. When camshaft, lifter, and cylinder wall corrosion is found, low utilization aircraft are often involved. Of course only calendar checks would not provide for corrosion prevention because it depends on the type of the oil used for operation and preservation, length of flights and storage conditions etc.

comment 28 comment by: *British Gliding Association*

Appendix XIV to AMC #2 M.A.302 – Inspection to Time Between Overhauls
3.2 Internal condition
The AMC does not take into account trend monitoring by carrying out spectrograph oil analysis.
Consider adding the following;
Engines used for towing, aerobatics and similar type operations should be condition monitored by regular oil analysis at annual maintenance checks or every 400 operating hours whichever occurs first.
Justification:
Oil analysis is a relatively inexpensive and reliable way of trend monitoring engines and help identifying possible problems before they manifest into failures.

response *Not accepted*

Please refer to the response to comment No 40.

comment 29 comment by: *British Gliding Association*

Appendix XIV to AMC #2 M.A.302 – Inspection to Time Between Overhauls
3.2 Internal condition
Consider adding the following;
The internal condition of an engine can be inspected with the aid of endoscope equipment to assess for corrosion and contaminates.
Justification:
Although wear is difficult to see, corrosion, cracks and burning are usually visible without major engine dismantling using endoscope equipment and is a reliable tool to assess internal condition.

response *Noted*

Please refer to the response to comment No 124.

comment 30 comment by: *British Gliding Association*

Appendix XIV to AMC #2 M.A.302 – Inspection to Time Between Overhauls
3.4 Compression check
Consider adding the following;
A low compression is not necessarily indicative of other engine wear as usually these components (cylinders, pistons, valves or cylinder heads) can be replaced without disturbing the core engine. If more than one cylinder is showing signs of wear consider carrying a top overhaul of the engine. This will also present an opportunity, in the majority of cases, access for an internal visual inspection of the engine as well as restoring the power output.
Justification:
"Top End" components are almost considered as consumable items. On a new Lycoming cylinder the normal life is in the region of 1000 to 1500 hours before

response	<p>some work is required and very much depends on engine management.</p> <p><i>Noted</i></p> <p>As mentioned in AMC#2 M.A.302(d)(2)(c) the pass-fail criteria should be stated in maintenance programme prior to performing the inspection on the TBO extension. Such pass-fail criteria usually is based on the guidance contained in the DAH's maintenance data. Taking into account the fact that some DAHs could have already included such data in their maintenance data, the statement on serviceability of the cylinders/pistons/valves etc. can contradict with such data.</p>
comment	<p><i>31</i> <i>comment by: British Gliding Association</i></p> <p>Appendix XIV to AMC #2 M.A.302 – Inspection to Time Between Overhauls New paragraph suggestion Oil Analysis By carrying out regular oil spectrograph oil analysis the engine can be trend monitored for wear in components and contamination and help identify possible problems. For example an increase in Iron could indicate gear wear; an increase in Copper could indicate that a shell bearing has worn through the white metal; High silica content could indicate that the air filtration is inadequate. Oil analysis samples should ideally be taken directly after a flight when any particles are in suspension, take a mid flow sample to avoid erroneous results. Incidents such as hard landings or turbulence should be noted as these may adversely affect the results. Analysis taken over a period of time will allow trend monitoring and aid determining the condition of the engine. Many major engine manufacturers publish data to assist in determining engine condition from oil analysis results.</p>
response	<p><i>Noted</i></p> <p>Please refer to the response to comment No 40.</p>
comment	<p><i>32</i> <i>comment by: British Gliding Association</i></p> <p>Appendix XIV to AMC #2 M.A.302 – Inspection to Time Between Overhauls New paragraph suggestion For engines that are used infrequently or in storage, consideration should be given to inhibiting the engine. Short ground running to attempt to preserve the engine is not recommended as it is unlikely that the engine will reach full operating temperature and boil off any water accumulated by condensation. The only way to preserve non-inhibited engines is by flying on a regular basis as the engine will usually reach full operating temperature with the correct cooling flow. Engines infrequently used should also have regular oil changes to remove harmful acids and contaminants.</p>
response	<p><i>Noted</i></p> <p>In most of the cases the DAHs prescribe special conditions to be maintained for the storage, whether it is more frequent oil change or special type of the oil used only for the storage. The aircraft storage conditions would be reflected in the physical condition of the engine. The corrosion signs should be detected by the means of the checks and inspections presented in the Appendix XIV to AMC#2 M.A.302 (d). Besides that, some general precautions are stated in the introduction of the abovementioned appendix. Also please refer to the response to the comment No 67.</p>

comment	<p>79 comment by: <i>Luftfahrt-Bundesamt</i></p> <p>II. Zu Appendix XIV zu AMC#2 M.A.302 (d) Dieser Anhang stellt letztendlich ein Prüfprogramm für Kolbenflugmotoren dar. Es ist fast deckungsgleich mit dem LBA veröffentlichten PP per NfL II-95/00.</p> <p>III. Fehlende Ausarbeitungen Neben den Motoren wäre es wünschenswert, dass es auch für Verstellpropeller ein entsprechendes PP geben würde. Hier sollte die EASA eine Ergänzung entwickeln. Dies gilt auch für Schläuche aus Elastomeren. Darüber hinaus gibt das ganze NPA keine Prüfverfahren für die anderen Komponenten an. Dies lässt eine große Bandbreite zu und kann zu unterschiedlichen Genehmigungsverfahren führen. Es bietet sich hier eine Tabelle an, ähnlich wie es mit den AMC zu den Anhängen VII und VIII gemacht worden ist. Zum einen sollten hier TBO behaftete Komponenten mit den erforderlichen Mindestprüfumfängen aufgelistet sein.</p>
response	<p><i>Noted</i></p> <p>Since this AMC is the first step to soften the requirements for General Aviation aircraft, it is possible that further changes would also cover the other components. Although, most of guidance proposed by this AMC is dedicated to the piston engine, it provides for the other components' TBO extensions as well. In addition Item 4 of AMC#2 M.A.302(d) – Time Between Overhauls gives a possibility to apply complete condition monitoring maintenance programme for components, instead of TBO, subject to certain conditions and approval by the competent authority. Also, NPA 2012-17 'Part-M General Aviation Task Force (Phase I)' was issued and it proposes some alleviations for ELA1 and in some cases ELA2 aircraft as well. For ELA1 aircraft not involved in commercial operations, it introduces the Minimum Inspection Programme (annual/100 FH), together with the possibility of establishing the self-declared maintenance programme. It also provides for a privilege to a Part-145/M.A. Subpart F maintenance organisations to manage and approve the maintenance programme for ELA2 aircraft. Thus it provides for further relief from current maintenance requirements for mentioned categories of aircraft.</p>
comment	<p>80 comment by: <i>Luftsport Verband Bayern / Germany</i></p> <p>Correction factor: The engine DAH may not be interested in providing such factors, even if there may be different factors necessary for different propellers attached. There may also be slight differences in the motor power awhen leaving the factory and the same for propeller efficiency. This requires adjustment of the propeller setting to reach the full RPM. This may affect the factor too. So the DAH has no benefits from this task.</p> <p>A test with a constant speed propeller implies that no one has changed the propeller setting since the last test has been performed.</p>
response	<p><i>Accepted</i></p> <p>Please refer to the response to comment No 82.</p>
comment	<p>81 comment by: <i>Luftsport Verband Bayern / Germany</i></p>

	6 Power loss: The last sentence should be extended to "... are all maintenance operations that may result in smoother running and improve engine power and are not limiting the TBO. "
response	<p><i>Noted</i></p> <p>The intention of Para 6 is to state if the problem will be eliminated after mentioned replacement/tuning then the TBO can be extended. In all other cases the engineering judgment is needed from maintenance organisation/certifying staff to take the decision on further operation of the engine.</p>
comment	<p><i>91</i> comment by: CAA-NL</p> <p>On paragraph 3.3 We suggest to include regular oil sampling analysis (SOAP) on top of the check on oil consumption, specifically when the engine is on a condition monitoring program.</p>
response	<p><i>Not accepted</i></p> <p>Please refer to the response to comment No 40.</p>
comment	<p><i>110</i> comment by: Swedish Transport Agency, Civil Aviation Department (Transportstyrelsen, Luftfartsavdelningen)</p> <p>· NPA Appendix XIV to AMC#2 M.A.302 (d), 3.2 Internal condition. Add:</p> <ul style="list-style-type: none"> o The inspection may include removal of enough cylinders to enable inspection of camshaft and internal engine surfaces for corrosion and wear. o In bullet 3.4 "Compression check" in order to support the intention mentioned in the explanatory notes IV, 9.1. bullet 5 to have a pass fail philosophy and standardize the method used we strongly suggest that some more detailed information about how to accomplish this check should be added. E.g. the description of that the difference pressure should be measured over an orifice of a specific diameter, and that there is a recommendation for a max differential pressure. o 3.4 "Compression check" Propose to be renamed to "Cylinder leak check".
response	<p><i>Not accepted</i></p> <p>The size of orifice is usually prescribed by the DAH or should be referred in widely used industry standards. The terminology is based on guidance already applied by some NAAs.</p>
comment	<p><i>119</i> comment by: AESA (SPAIN)</p> <p>Comment 4 Appendix XIV to AMC#2 M.A 302 (d) - Time Between Overhauls 8 Logbook entries A record of the checks made, and any rectification or servicing work, must be entered and certified in the engine logbook before the engine is cleared to service for its recommended or extended life under the provision of AMC#2 M.A.302 (d). Comment: It should be clarified if the expression "cleared to service" means a release to service by an appropriately maintenance organisation, Also if this represents that the inspection is conclusive (as mentioned in AMC#2 M.A 302 (d) – 2.e) or it is</p>

response	<p>required further analysis by a CAMO or private owners.</p> <p><i>Accepted</i></p> <p>The text has been changed quoting 'released to service'. The provisions of AMC#2 M.A.302(d)2(e) mean that the inspection is conclusive and the maintenance organisation/certifying staff should evaluate the results.</p>
comment	<p><i>124</i> comment by: <i>DGAC FRANCE</i></p> <p>- <u>Appendix XIV à l'AMC#2 MA302(d)</u>: DGAC France comments are basically consistent with the current 100hours/1yaer visit requirements. The only minor comment that could be added within the appendix is dealing with corrosion detection as follows: add the sentence: "Inspections such as detailed visual inspection after cylinder removal and/or borescope examination can also be proposed to reasonably detect the corrosion in the engine. Therefore, it may allow an unlimited extension of the calendar TBO."</p>
response	<p><i>Partially accepted</i></p> <p>The pass-fail criteria should be stated in the maintenance programme. Thus it is believed that the cylinder will be removed after the one of the mentioned in Appendix inspections/tests. Otherwise the defined interval needs to be added to the Appendix. This might not be effective because it will strongly depend on different conditions of operations and storage. The number of TBO extensions, MTOW of the aircraft and types of operation eligible for the extension based on guidance already applied NAAs. During the process of preparation of the NPA the questionnaire was proposed to the different NAAs to determine the scope of the guidance applied by them. The resulting text is the derivative of cumulative data based on different approaches used by Member States. Nevertheless, the other methods that are effective also may be used if they are approved as part of maintenance programme. The corresponding provisions are added to the text of the Appendix XIV to AMC#2 M.A.302 (d).</p>
comment	<p><i>135</i> comment by: <i>EFLEVA</i></p> <p>Appendix XIV to AMC#2 M.A.302 (d) — Inspection to Time Between Overhauls. Page 12, section 3.3 Oil consumption. While oil consumption monitoring is important, rather than limit the TBO because the consumption is likely (at some point in the future) to exceed the DAH recommendation, it would be better to allow continued operation until the consumption in a 10 hour period reaches the limit set by the DAH recommendation.</p>
response	<p><i>Not accepted</i></p> <p>The oil consumption would not be the only factor indicating the condition of the engine, thus to rely only on oil consumption would be insufficient. Also please refer to the paragraph 2 of response to comment No 124 above.</p>

4. Appendix A - Attachments

 [230-1039\[1\].pdf](#)

Attachment #1 to comment [#5](#)

 [EASA NPA 2011-15.pdf](#)

Attachment #2 to comment [#36](#)

 [2011-11-30 EASA NPA No. 2011-15.pdf](#)

Attachment #3 to comment [#34](#)