

# **RUSSIAN FEDERATION**

# MINISTRY OF TRANSPORT OF RUSSIAN FEDERATION

# FEDERAL AIR TRANSPORT AGENCY

**AIRWORTHINESS DIRECTIVE** 

03 of December, 2021

No. 2021-AHCAT-CK-05

Applicability – ANSAT helicopters (model ANSAT-GC)

Designer's State - RUSSIAN FEDERATION

Corrective actions stated in the present Airworthiness Directive are mandatory. None of the operators is allowed to operate the aircraft covered by present Airworthiness Directive otherwise than according to the requirements of present Directive.

In connection with the aviation accident occurred on 23.09.2021 with the ANSAT helicopter RA-20014 (serial No. 33090), which made a hard landing due to decrease in control margins in directional control channel, which resulted in uncontrolled left rotation of the helicopter during the approach, and detection of destruction of the bearing 6-3056204 ETY100/3 of the tail rotor sliding bar, as well as based on Technical Decision of JSC "Kazan Helicopters" No. 1/144-2021-KB3 Revision 3 dated 30.10.2021, in order to ensure airworthiness of the ANSAT-GC helicopters, being in operation, at the stage of serial production or transfer to the operator, the following is

## **PROPOSED:**

- 1. Based on Conclusion of Chief designer of Design Bureau of JSC "Kazan Helicopters" No. AHC-ΠΡ-3ЧУРВ-2021-1 dated 20.10.2021 to allow ANSAT-GC helicopters installation of the bearing 6-3056204У ETУ100/3 instead of bearing 6-3056204 ETУ100/3 (Appendix 3 of Technical Decision No. 1/144-2021-KB3 dated 30.10.2021).
- 2. To perform works in accordance with the pp. 1.2-1.4, 6, 7, 7.1 of Technical Decision of JSC "Kazan Helicopters" No. 1/144-2021-KB3 dated 20.10.2021 on the entire fleet of ANSAT-GC helicopters from the moment of the issue of present airworthiness directive.
- 3. To establish service life limitation of 300 f. h. for tail rotor sliding bar bearings 6-3056204 ETY100/3, having total operating time less than 300 f. h. at the

moment of issue of present airworthiness directive. To establish service life limitation of 100 f. h. over the total operating time for tail rotor sliding bar bearings 6-3056204 ETY100/3, having total operating time of 300 f. h. and more at the moment of issue of present airworthiness directive.

To establish service life / service time for newly installed bearings 6-3056204 ETY100/3 (6-3056204Y ETY100/3) – 300 f. h. / 8 years.

- 4. To establish the frequency of works on the replacement of grease of bearing 6-3056204 ETY100/3 (6-3056204Y ETY100/3) according to task card No. 064.10.00g of Maintenance manual 343.0000.00P9 every 50±5 f. h.
- 5. To establish the frequency of checking the axial play of the bearing 6-3056204 ETY100/3 (6-3056204 ETY100/3) according to task card No. 064.20.00f of Maintenance manual 343.0000.00P $\Theta$  every  $50\pm 5$  f. h. Limitation for value of axial play of bearing 6-3056204 ETY100/3 no more than 0.014 mm, for bearing 6-3056204 ETY100/3 no more than 0.035 mm.
- 6. To establish the frequency of works on the replacement of grease of bearings 6-2007105A of ANSAT helicopter tail rotor common flapping hinge according to task card No. 064.20.00k of Maintenance manuals 343.0000.00P3 every 50±5 f.h.
- 7. Airworthiness directive comes into force from the date of its issue. Operators shall follow the requirements of paragraphs of present airworthiness directive until the issue of service bulletin A0465-БЭ-Г by JSC "Kazan Helicopters" or issue of another airworthiness directive on this aviation accident.

**Appendix:** Technical decision No. 1/144-2021-KB3 Revision 3 dated 30.10.2021, 15 sheets.

Deputy Director General

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YENDHYERE YNSIT BC

A.A. Novgorodov

И.В. Пономарев

## **APPROVED BY**

Deputy managing director – Head of design JSC "Kazan Helicopters", A.O. Garipov

# TECHNICAL DECISION No. 1/144-2021-KB3

on continued airworthiness of ANSAT helicopters (ANSAT, ANSAT-GC models), ANSAT-K (ANSAT-K model) and their modifications in connection with failure of the bearing 6-3056204 ETY100/3 of tail rotor sliding bar

#### **Revision 3**

In connection with the aviation accident occurred on 09/23/2021 with the ANSAT helicopter No. 33090 (RA-20014), which made a hard landing, inspection of the helicopter was carried out and destruction of the bearing 6-3056204 ETY100/3 of the tail rotor sliding bar was detected. This destruction resulted in decrease in control margins and uncontrolled left rotation of the helicopter during landing.

In order to ensure the airworthiness of the ANSAT, ANSAT-K helicopters and their modifications, which are in operation and at the stage of serial production at JSC "Kazan Helicopters", the following decision was made.

#### **DECISION:**

- 1. On the entire fleet of ANSAT helicopters (ANSAT and ANSAT-GC models), ANSAT-K helicopters and their modifications (from the moment of issue of the airworthiness directive):
- 1.1 Remove from operation the bearings 6-3056204 ETY100/3 of tail rotor sliding bar installed on the ANSAT helicopters having serial numbers 33072, 33073, 33077, 33088...33093 by the ANSAT helicopters manufacturer JSC "Kazan Helicopters" in the course of their manufacturing (if the bearings were not replaced on the mentioned helicopters in the course of operation).
- 1.2 Perform works according to task cards Nos. 022.52.00f, 064.10.00c, 064.20.00a, 064.20.00b, 065.10.00a, 065.20.00a, 067.20.00a, 067.20.00e, 067.20.00h of Maintenance manuals 338.0000.00PЭ, 343.0000.00PЭ for ANSAT helicopter (ANSAT and ANSAT-GC models respectively), according to task cards Nos. 065.20.00a, 065.20.00b, 065.20.00ж, 065.40.00e, 084.30.00a, 084.40.00a of Maintenance manual 340.0000.00PЭ (for ANSAT-K helicopter).
- 1.3 Perform operations and inspections of the tail rotor elements in accordance with the temporary task card No. 064.20.00m (Appendix 1). List of parts and assemblies of tail rotor hub is given in Appendix 2.
- 1.4 Inform JSC "Kazan Helicopters" and FATA about the results of works performed under paragraphs 1.1-1.3.

When performing the works per paragraphs 1.2-1.3, it is allowed to consider the works, earlier performed according to the letter of JSC "Kazan Helicopters" No. 32426-144 dated 01.10.2021, as completed.

on continued airworthiness of ANSAT helicopters (ANSAT, ANSAT-GC models), ANSAT-K (ANSAT-K model) and their modifications in connection with failure of the bearing of tail rotor sliding bar Revision 3

- 2. Upon completion of works per paragraphs 1.2-1.3 of present technical decision and in the absence of any remarks:
- for tail rotor sliding bar bearings 6-3056204 ETY100/3, having total operating time less than 300 f. h. at the moment of issue of airworthiness directive, establish service life limitation of 300 f. h.;
- for tail rotor sliding bar bearings 6-3056204 ETY100/3, having total operating time of 300 f. h. and more at the moment of issue of airworthiness directive, establish service life limitation of 100 f. h. over the total operating time.
- 3. Allow the installation of bearing 6-3056204Y ETY100/3 instead of bearing 6-3056204 ETY100/3 (basis Conclusion No. AHC-IIP-34YPB-2021-1, Appendix 3).

Service life / service time for newly installed bearings 6-3056204 ETY100/3 (6-3056204 ETY100/3) -300 f. h. / 8 years.

- 4. Establish the frequency of works on the replacement of grease of bearing 6-3056204 ETY100/3 (6-3056204Y ETY100/3) according to task card No. 064.10.00g of Maintenance manuals 338.0000.00PЭ, 343.0000.00PЭ for ANSAT helicopter (ANSAT and ANSAT-GC models respectively), according to task card No. 065.20.00π of Maintenance manual 340.0000.00PЭ (for ANSAT-K helicopter) every 50±5 f. h.
- 5. Establish the frequency of checking the axial play of the bearing 6-3056204 ETY100/3 (6-3056204Y ETY100/3) according to task card No. 064.20.00f of Maintenance manuals 338.0000.00P9, 343.0000.00P9 for ANSAT helicopter (ANSAT and ANSAT-GC models respectively), according to task card No. 065.20.00m of Maintenance manual 340.0000.00P9 (for ANSAT-K helicopter) every 50±5 f. h.

Limitation for value of axial play of bearing 6-3056204 ETY100/3 – no more than 0.014 mm, for bearing 6-3056204Y ETY100/3 - no more than 0.035 mm.

6. Perform works on replacement of bearing 6-3056204 ETY100/3 (6-3056204Y ETY100/3) according to task cards Nos. 064.20.00c, 064.20.00d of Maintenance manuals 338.0000.00P9, 343.0000.00P9 for ANSAT helicopter (ANSAT and ANSAT-GC models respectively), according to task cards Nos. 065.20.00B, 065.20.00F of Maintenance manual 340.0000.00P9 (for ANSAT-K helicopter).

Before installation wash the bearing in  $HE\Phi PAC$  solvent and check for smooth rotation without jamming. It is not allowed to install the bearing in case jamming was detected.

After replacement of bearing 6-3056204 ETY100/3 (6-3056204Y ETY100/3) check adjustment of tail rotor control system in accordance with the task card No. 067.20.00f of Maintenance manuals 338.0000.00PЭ, 343.0000.00PЭ for ANSAT helicopter (ANSAT and ANSAT-GC models respectively), in accordance with the task card 065.40.00µ of Maintenance manual 340.0000.00PЭ (for ANSAT-K helicopter).

It is prohibited to reinstall the bearing 6-3056204 ETY100/3 (6-3056204Y ETY100/3) from tail rotor sliding bar of one helicopter to tail rotor sliding bar of another helicopter.

7. Record of replacements and total operating time of bearing 6-3056204 ETY100/3 and 6-3056204Y ETY100/3 shall be kept in the certificate 333.3520.1000-ΠC of tail rotor sliding bar in section "7.2. Running repair and works performed according to service bulletins and instructions".

on continued airworthiness of ANSAT helicopters (ANSAT, ANSAT-GC models), ANSAT-K (ANSAT-K model) and their modifications in connection with failure of the bearing of tail rotor sliding bar Revision 3

7.1 Make changes in the certificate 333.3520.1000- $\Pi$ C of tail rotor sliding bar according to the Annex 4.

At that make an entry in column "Remarks" in section 2 "Delivery set" of certificate 333.3520.1000-ΠC of the number of actually installed washer 333.3500.0033- and 333.3500.0037- (see Annex 5), having measured their thicknesses beforehand.

- 8. Establish the frequency of works on the replacement of grease of bearings 6-2007105A of ANSAT helicopter tail rotor common flapping hinge according to task card No. 064.20.00k of Maintenance manuals 338.0000.00P9, 343.0000.00P9 for ANSAT helicopter (ANSAT and ANSAT-GC models respectively) every 50±5 f.h.
- 9. The present technical decision also applies to ANSAT helicopters (ANSAT and ANSAT-GC models), ANSAT-K helicopters and their modifications, which are at the stage of final assembly, painting, acceptance testing and tests, as well as transfer to Customer at JSC "Kazan Helicopters".
- 10. Operators shall follow the requirements of the paragraphs of this technical decision until the issue of service bulletin A0465-БЭ-Γ by JSC "Kazan Helicopters" or issue of another airworthiness directive.

# on continued airworthiness of ANSAT helicopters (ANSAT, ANSAT-GC models), ANSAT-K (ANSAT-K model) and their modifications in connection with failure of the bearing of tail rotor sliding bar Revision 3

APPENDIX 1

	Temporary task card 064.20.00 м			
Procedure: Inspection of tail rotor elements				
	Operations and technical requirements	Corrective actions		
1.1 Place a 1.2 Connec maximu 1.3 Unlock a rocker. 1.4 Unlock a 1.5 Unlock a 1.6 Install f installed 1.7 Unlock a 1.8 Having bearing 2. Check the non-smoot 3. Remove be	iding bar from tail gearbox shaft: step-ladder near the tail gearbox.  t a ground hydraulic unit to the helicopter hydraulic system. Switch on the power supply. Set the sliding bar to a um extended position, having fully pressed the left pedal in the pilot's cabin as far as it can go. and undo the nuts from the bolts attaching tie-rods to the rocker, remove the bolts. Disconnect tie-rods from the and undo the nuts of the blades scissors pins. Remove washers of hubs and tie-rods from the pins. The nut retaining the outer ring of the sliding bar bearing. The sixture 333.9950.000 (HAΠΦ.333.9950.000) on the rocker and undo the nut. Remove the washer and cover do in the sliding bar. The rod nut, having unbent lobes of the flap locks. Undo the nut. Remove the stop washer from the rod. The rod nut, having unbent lobes of the flap locks. Undo the nut. Remove the sliding bar. Remove the land the bushing, installed under the bearing, from the rod.  The post of this card) with the bushing (pos. 30) installed in it for absence of seizing, jamming, having, extraneous noise. In case of detection of these defects, the bearing and bushing shall be replaced.  The BUSHING MUST BE REMOVED FROM THE BEARING WITHOUT TENSION, BY HAND FORCE. THERE SHOULD BE NO MECHANICAL DAMAGES ON THE BEARING (INCLUDING VISIBLE PARTS OF			
4. Install the s	THE SEPARATOR) (SCRATCHES, NICKS). THE BEARING SHOULD ROTATE SMOOTHLY, WITHOUT JAMMING.  sliding bar on the tail gearbox shaft:			

on continued airworthiness of ANSAT helicopters (ANSAT, ANSAT-GC models), ANSAT-K (ANSAT-K model) and their modifications in connection with failure of the bearing of tail rotor sliding bar

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4.1 Install the bushing on the rod.

Install the bearing on the bushing, having first flushed it from the old grease and applied fresh ЦИАТИМ-201 grease on it.

**CAUTION:** 

THE BEARING MUST BE INSTALLED ON THE BUSHING WITHOUT TENSION, BY HAND FORCE. THERE SHOULD BE NO MECHANICAL DAMAGES ON THE BEARING (INCLUDING VISIBLE PARTS OF THE SEPARATOR) (SCRATCHES, NICKS). THE BEARING SHOULD ROTATE SMOOTHLY, WITHOUT JAMMING.

The bearing should be installed in such a way that the bearing marking is facing in the direction opposite to the tail rotor.

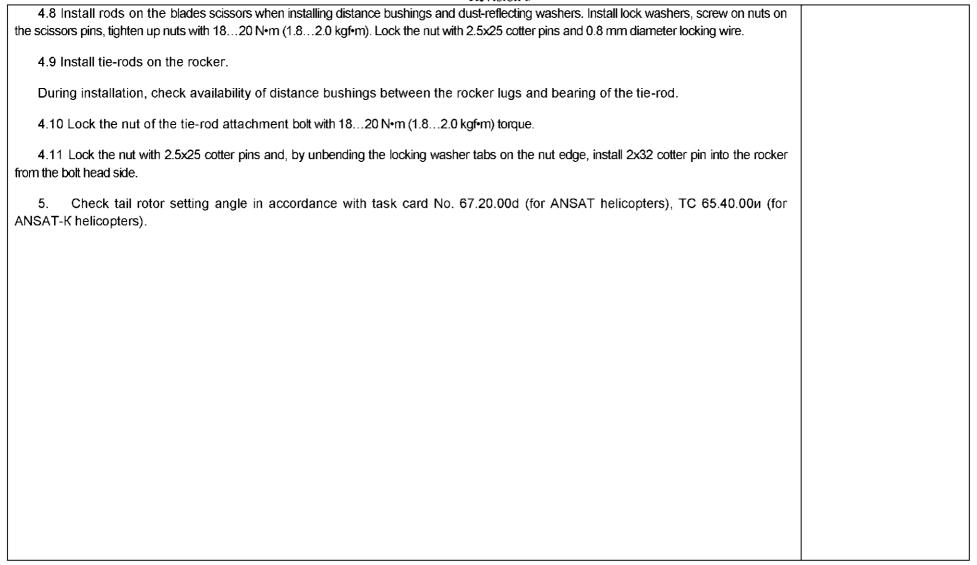
4.2 Install the retaining washer on the rod.

Install new flap locks on the rod grooves.

- 4.3 Screw on the rod nut on the rod and lock it with 18...20 N·m (1.8...2.0 kgf·m) torque, by aligning grooves on the rod with nut slots.
  - 4.4 Lock the rod nut, having bent lobes of the flap locks into the nut slots.
  - 4.5 Slide the sliding bar from the tail rotor, having put the sliding bar bearing, secured on the rod, into the sliding bar.
- 4.6 Install the cover and washer. Return the nut into the sliding bar and tighten it with 60...70 N·m (6.0...7.0 kgf·m) torque using fixture 333.9950.000 (HA $\Pi\Phi$ .333.9950.000) preinstalled on the rocker. When tightening the nuts, align the nut slots with holes in the sliding bar.
- 4.7 Lock the nut using two locking screws, installed in the holes of the sliding bar, aligned with the grooves of the nut (pos. 35) and screw them into the nuts (pos. 45). Lock the screws with locking wire 0.8mm in diameter wire.

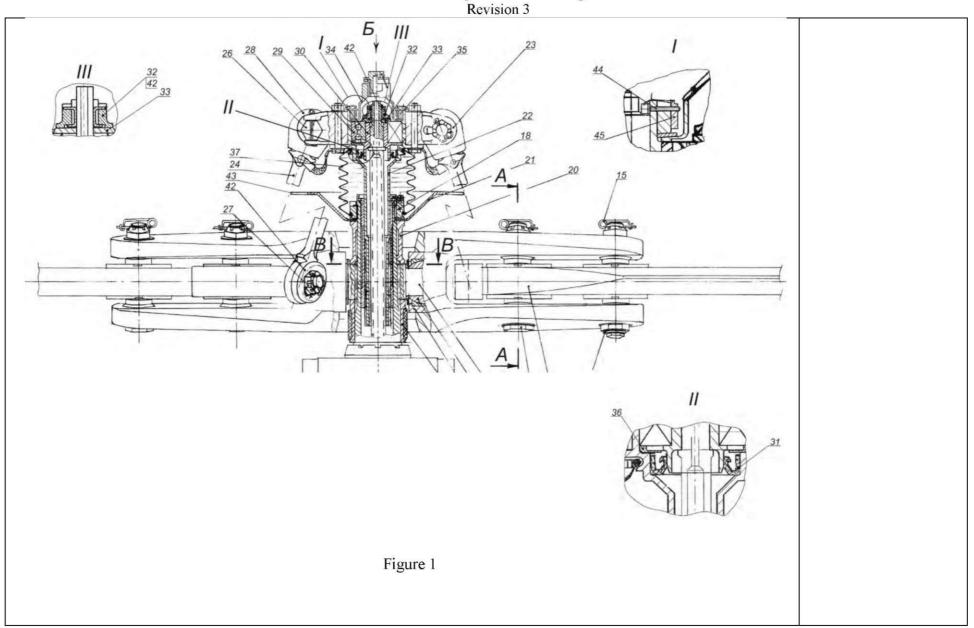
on continued airworthiness of ANSAT helicopters (ANSAT, ANSAT-GC models), ANSAT-K (ANSAT-K model) and their modifications in connection with failure of the bearing of tail rotor sliding bar

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on continued airworthiness of ANSAT helicopters (ANSAT, ANSAT-GC models), ANSAT-K (ANSAT-K model) and their modifications in connection with failure of the bearing of tail rotor sliding bar

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on continued airworthiness of ANSAT helicopters (ANSAT, ANSAT-GC models), ANSAT-K (ANSAT-K model) and their modifications in connection with failure of the bearing of tail rotor sliding bar

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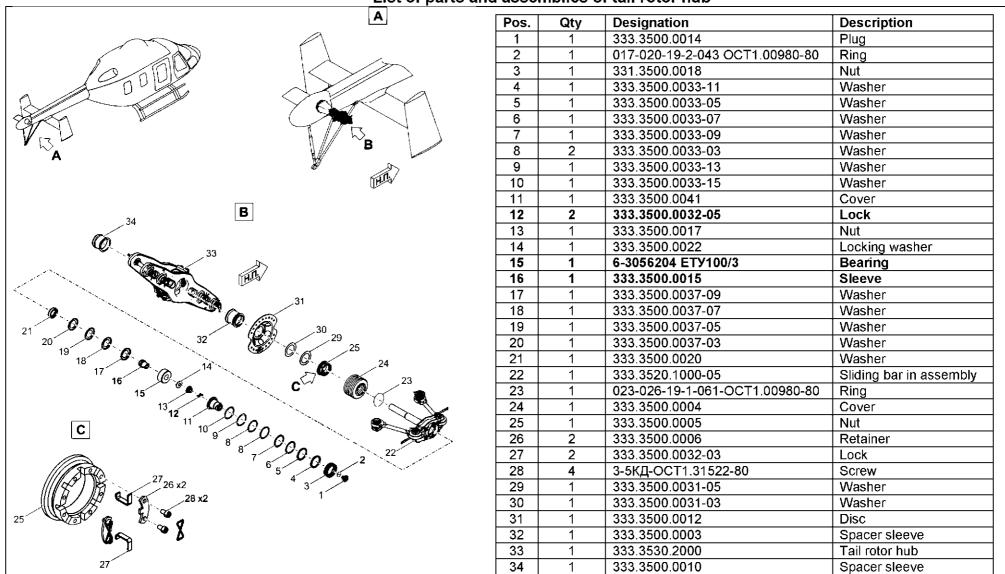
	Revision 5		
Test equipment	Tools and appliances	Expendable materials	
Ground hydraulic unit	Combination pliers L=160 mm Wrenches S=19x22, S=10x11, S=12x14; S=17x19 Calibrated wrench Screwdriver 1.6x10x275 Device for tightening the sliding bar bearing nut 333.9950.000 (НАЛФ.333.9950.000) Attachment piece ЧА.9100.250 for the tail rotor hub nut (НАЛФ.ЧА.9100.250) Bushing ЧА.9100.202 (НАЛФ.ЧА.9100.202) Wrench interchangeable tool S=17 mm End attachment piece S=14 mm Changeable ratchet for 1/4" Tail beam support 333.9900.100 (НАЛФ.333.9900.100) Stepladder H=1400 mm (stepladder 333.9917.100 (НАЛФ.333.9917.100)) Torque wrench up to 100 N·m	Cotton cloth HEΦPAC solvent Grease CT (HK-50) Grease ЦИАТИМ-201 Oil Б-3B Cotter pins 3,2x40 per ГОСТ 397- 79 standard Cotter pin 2,5x25.0.02 per ГОСТ 397-79 standard Cotter pins 2x32 per ГОСТ 397-79 standard Wire KC 0,8 Flap locks 333.3500.0032-03	

on continued airworthiness of ANSAT helicopters (ANSAT, ANSAT-GC models), ANSAT-K (ANSAT-K model) and their modifications in connection with failure of the bearing of tail rotor sliding bar

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# ANNEX 2

# List of parts and assemblies of tail rotor hub



# **APPROVED BY**

Deputy managing director – Head of design JSC "Kazan Helicopters", A.O. Garipov

# CONCLUSION No. AHC-ПР-3ЧУРВ-2021-1

about the possibility of installation of bearing 6-3056204Y ETY100/3 instead of bearing 6-3056204 ETY100/3 of the actuating portion of tail rotor control system of ANSAT, ANSAT-K helicopters and their modifications

This Conclusion is based on the following documents:

- 1. ANSAT helicopter Certification basis C5 AHCAT.29-2013 Issue 2:
- 2. Conclusion No. AHC-C3-Πp-2016-1 on the compliance of static strength of the ANSAT helicopter type design with the requirements of Certification basis C5 AHCAT.29-2013. Type design major change "Maximum takeoff weight 3600 kg", 2016;
- 3. Conclusion No. AHC-C3-29.571-2016-1 on the compliance of the ANSAT helicopter type design with the requirements of p. 29.571 of Certification basis СБ AHCAT.29-2013. Type design major change "Maximum takeoff weight 3600 kg", 2016;
  - 4. Letter of LLC "ТД ЕПК" ref. No. 906/83/8735 dated 26.08.2021.
- 5. Report No. 1711 ИЛ ПНК ЛА of Kazan State Technical University named after A. N. Tupolev "Wear tests of three bearings 6-3056204У of the tail rotor rod of the ANSAT helicopter", 2003.

Based on the analysis of the listed materials, the following has been established.

- 1. Strength of bearing 6-3056204 ETY100/3 of the actuating portion of tail rotor control system of the ANSAT helicopter is analyzed in accordance with the Certification basis [1] and established on the basis of conclusions on static [2] and fatigue [3] strength.
- 2. Based on letter [4] the identity of the design of bearings 6-3056204 ETY100/3 and 6-3056204Y ETY100/3 is shown, with the exception of the axial clearance value:
  - bearing 6-3056204 ETY100/3 has an axial clearance up to 0.01 mm;
  - bearing 6-3056204Y ETY100/3 has an axial clearance of 0.015...0.030 mm.
- 3. Changing the value of the operating axial clearance does not affect the static and fatigue strength of the bearing.
- 4. Based on the test results [5] and the methodology of assessment of the permissible safe interval for evaluation of the technical condition by measuring the axial play used in drawing up the conclusion [3], the permissible interval for assessing the technical condition by measuring the axial play in operation of bearing 6-3056204Y ETY100/3 is at least 283 hours with allowable total operating time of 1132 hours.

Tests were carried out with the use of grease ЦИАТИМ-201.

5. The increase in axial play during the tests [5] was 0.014 - 0.006 = 0.008 mm. Therefore, the justified limit value of play of the bearing 6-3056204 ETY100/3 should be considered as the following value:

0.030 + 0.008 = 0.038 mm.

6. The provisions of this conclusion, due to the identity of design of the actuating portion of tail rotor control system and operating conditions, can be extended to the ANSAT-K helicopter and its modifications.

# 7 Conclusions

- 7.1 Based on the analysis of the design, it is allowed to install the bearing 6-3056204V ETV100/3 instead of bearing 6-3056204 ETV100/3 in the actuating portion of tail rotor control system of ANSAT, ANSAT-K helicopters and their modifications.
- 7.2 Based on the materials provided in this conclusion, establish airworthiness limitation for bearing 6-3056204Y ETY100/3 in the amount of 300 f. h./8 years.
- 7.3 Establish the interval of assessment of technical condition by measuring the axial play of bearing 6-3056204 V ETY100/3 equal to  $50\pm 5$  f. h. Permissible value of the axial play should not exceed 0.035 mm.
- 7.4 Establish the interval of grease replacement in the bearing 6-3056204Y ETY100/3 equal to  $50\pm5$  f. h.

on continued airworthiness of ANSAT helicopters (ANSAT, ANSAT-GC models), ANSAT-K (ANSAT-K model) and their modifications in connection with failure of the bearing of tail rotor sliding bar Revision 3

**ANNEX 4** 

Revision of delivery set 333.3520.1000-ΠC

# Introduce the following text in section "2. DELIVERY SET":

Kit of mounting parts:

1. Nut	331,3500,0018	1
1. Nat	331:3300:3010	
2. Cover	333.3500.0004	1
3. Nut	333.3500.0008	2
4. Plug	333.3500.0014	1
5. Sleeve	333.3500.0015	1
6. Nut	333.3500.0017	1
7. Collar	333.3500.0020	1
8. Locking washer	333.3500.0022	1
9. Bushing	333.3500.0026	2
10. Bushing	333.3500.0027	2
		1

# Add sheet "Sheet 4":

			(	Continued
Description	Designation	Qty	Number	Remarks
1	2	3	4	5
11. Nut	333.3500.0028	2		
12. Washer	333.3500.0029	2		
13. Lock	333.3500.0032-05	2		
14. Washer	333.3500.0033-03	1*		
15. Washer	333.3500.0033-05	1*		
16. Washer	333.3500.0033-07	1*		
17. Washer	333.3500.0033-09	1*		
18. Washer	333.3500.0033-11	1*		
19. Washer	333.3500.0033-13	1*		
20. Washer	333.3500.0033-15	1*		
21. Washer	333.3500.0036	2		
22. Washer	333.3500.0037-03	1**		
23. Washer	333.3500.0037-05	1**		
24. Washer	333.3500.0037-07	1**		
25. Washer	333.3500.0037-09	1**		
26. Cover	333.3500.0040	1		
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on continued airworthiness of ANSAT helicopters (ANSAT, ANSAT-GC models), ANSAT-K (ANSAT-K model) and their modifications in connection with failure of the bearing of tail rotor sliding bar Revision 3

# Add sheet "Sheet 5":

				Continued
Description	Designation	Qty	Number	Remarks
1	2	3	4	5
27. Bearing	6-3056204 ЕТУ  100/3	1		
28. Ring	017-020-19-2-043 OCT 1 00980-80	1		
29. Screw	3-10 КД ОСТ 1 31522-	2		
30. Washer	0.5-3-6КД ОСТ 1 34507-80	2		
31. Wire	КС-0,8 ГОСТ 792- 67	L= 0,8		
32. Cotter pin	2,5x25.0.026 FOCT 397-79	2		

<sup>\*</sup>The mounting parts are selected by the contractor, when installing the sliding bar on the helicopter.

Change the numbering of subsequent pages in the certificate.

# Make an entry in section "8. Storage and operation notes":

"Using the kit of mounting parts from another sliding bar assembly is not allowed."

<sup>\*\*</sup> The mounting parts are selected by the contractor, when adjusting the tail rotor control system.

on continued airworthiness of ANSAT helicopters (ANSAT, ANSAT-GC models), ANSAT-K (ANSAT-K model) and their modifications in connection with failure of the bearing of tail rotor sliding bar Revision 3

## ANNEX 5

