



**AGÊNCIA NACIONAL DE AVIAÇÃO CIVIL - BRAZIL**

## **BRAZILIAN AIRWORTHINESS DIRECTIVE**

**AD No.: 2021-02-02**

**Effective Date: 26 Feb. 2021**

The following Brazilian Airworthiness Directive (AD), issued by the Agência Nacional de Aviação Civil (ANAC) in accordance with provisions of Chapter IV, Title III of Código Brasileiro de Aeronáutica - Law No. 7,565 dated 19 December 1986 - and Regulamento Brasileiro da Aviação Civil (RBAC) 39, applies to all aircraft registered in the Registro Aeronáutico Brasileiro. No person may operate an aircraft to which this AD applies, unless it has previously complied with the requirements established herein.

**[CORRECTED on 26 Feb. 2021]**

**AD No. 2021-02-02 - YABORÃ / 39-1478.**

### **APPLICABILITY:**

This Airworthiness Directive is applicable to Yaborã Indústria Aeronáutica S.A. aircraft models EMB-145, EMB-145ER, EMB-145EU, EMB-145EP, EMB-145LR, EMB-145MR, EMB-145LU, EMB-145MP, EMB-145MK, EMB-145XR, EMB-135BJ, EMB-135ER, EMB-135KE, EMB-135KL and EMB-135LR, all serial numbers.

### **CANCELLATION / REVISION:**

Not applicable.

### **REASON:**

On July 2020, there was an incident involving a disconnection of a Side Arm Strut from the right Main Landing Gear in an EMB-145 model aircraft. During the subsequent investigation it was found that the MLG Side Arm Strut Lower Bearing was installed inverted in the aircraft.

Prompted by this incident, an inspection of the MLG Side Strut assembly was carried out on the operator's EMB-145 fleet. This inspection revealed more instances of incorrectly assembled (inverted) MLG Side Strut Bearings as well as instances of Bearings migration (even when the Bearings are installed correctly) and damaged/missing Bearing's sealant and potentially degraded lubrication on other aircrafts of the operator.

The inspection revealed one occurrence of an MLG Lower Side Arm installed on an aircraft possessing grease fittings on both of its sides. This is not an approved configuration as the MLG Lower Side Arm must have both of its grease fittings installed on the same side (see Figure 1 below).

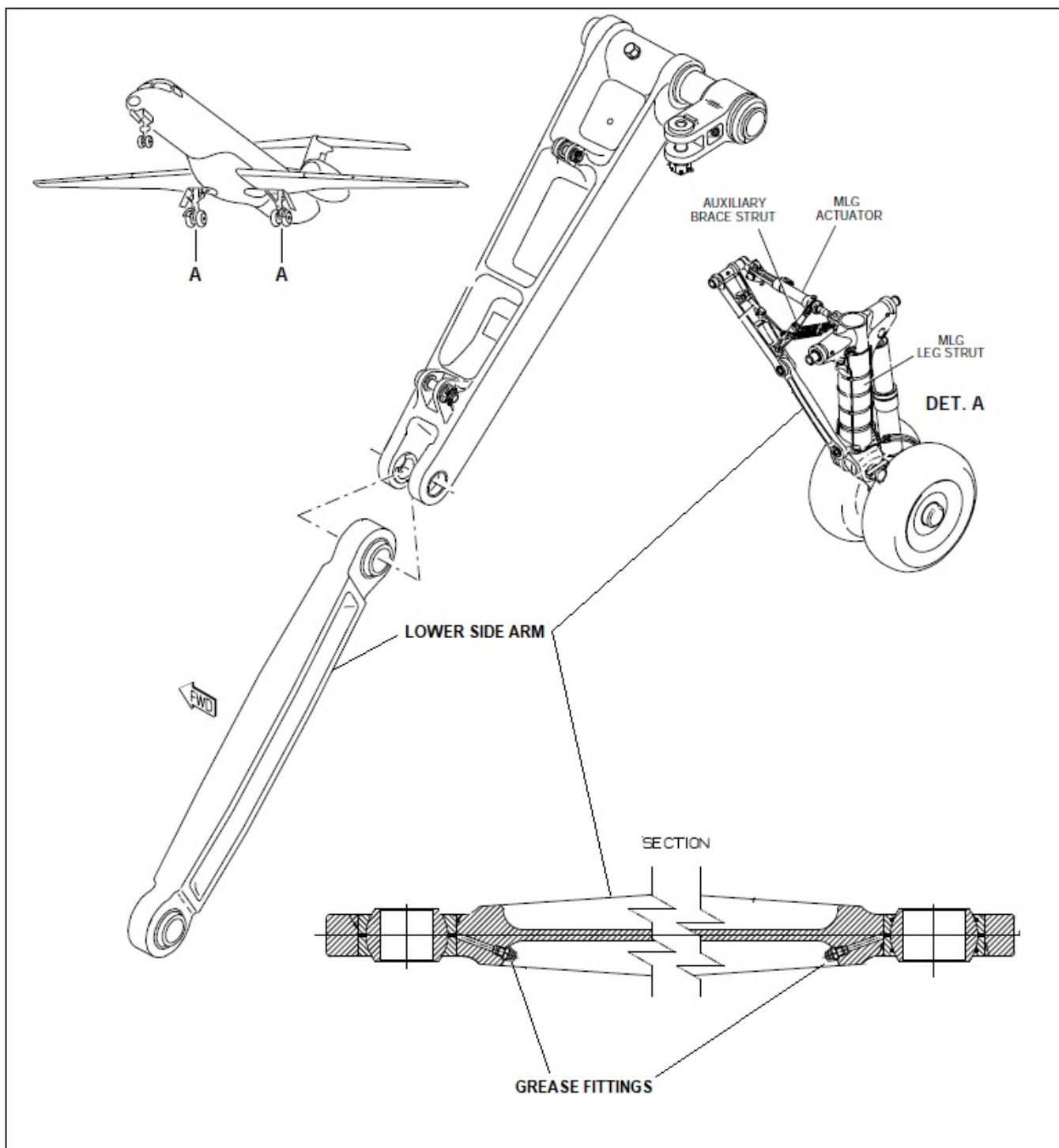


Figure 1: MLG Lower Side Arm correct grease fittings installation

An MLG Lower Side Arm with grease fittings on both of its sides could lead to a misinterpretation of the MLG assembly instructions which could culminate in an inverted installation of the MLG Side Arm Strut Bearings since the grease fittings installation side on the Lower Side Arm are used as a reference to the correct installation of the Bearings.

It was determined that the inverted installation of the MLG Side Arm Strut Bearing was a contributing factor to the disconnection of the Side Arm Strut from the Main Landing Gear.

The disconnection of the MLG Side Arm Strut could prevent the MLG to be locked in the down position, this could lead to a loss of control scenario during the landing and take-off phases. Therefore, corrective action is required, and sufficient reasons exist to mandate compliance with this AD in the indicated time limit.

**REQUIRED ACTION:**

For the reasons described above, this AD mandates:

A one-time inspection, and replacement of the MLG Lower Side Arm by a serviceable part (see NOTE 1), if necessary, as to the correct positioning of the grease fittings (see Figure 1).

A one-time inspection, and reinstallation of the MLG Side Arm Strut, if necessary, as to the inverted installation of the Bearings (see Figure 2).

A one-time inspection, and reinstallation of the MLG Side Arm Strut, if necessary, as to the migration of the Bearings.

NOTE 1: A serviceable MLG Lower Side Arm (P/Ns 2309-2510-501, or 2309-2510-503, or 2309-2510-505) is one that has both grease fittings installed on the same side of the part (see Figure 1).

NOTE 2: A Special Flight Permit (“Autorização Especial de Voo”) can be requested to ANAC (or to the Civil Aviation Authority, observing the respective regulatory code, of the state of registry of the aircraft, as applicable) to perform a ferry flight to an adequate location in order to perform the actions required by this AD.

### **COMPLIANCE:**

Required as indicated below, unless already accomplished.

#### **One-time inspections**

(a) Within the next 30 days or 150 FH (Flight Hours), after the effectivity date of this AD, whichever occurs first, visually inspect the right and left MLGs:

1. Verify that both grease fittings are installed on the same side of the MLG Lower Side Arm and that both are facing the flight direction;
  - i. If, during the inspection required by item (a)(1) above, it is found that the grease fittings are installed on opposite sides of the MLG Lower Side Arm (one grease fitting on one side and the other on the opposite side), before the next flight (see NOTE 2), replace the MLG Lower Side Arm by a serviceable part (see NOTE 1). To comply with this paragraph, refer to procedure 32-10-03/400 (MAIN-LANDING-GEAR MAIN BRACE STRUT - REMOVAL/INSTALLATION) of the AMM applicable to the aircraft, and to the CMM (Component Maintenance Manual), procedure T.P. 145/1190\_32-10-03, as necessary;
  - ii. If, during the inspection required by item (a)(1) above, it is found that both grease fittings are facing opposite to the flight direction, before the next flight (see NOTE 2), remove the Lower Side Arm and re-install it on the correct position (both grease fittings facing the flight direction – see Figure 1). To comply with this paragraph, refer to procedure 32-10-03/400 (MAIN-LANDING-GEAR MAIN BRACE STRUT - REMOVAL/INSTALLATION) of the AMM applicable to the aircraft, and to the CMM (Component Maintenance Manual), procedure T.P. 145/1190\_32-10-03, as necessary.
2. Verify that the flanges of the 2 MLG Side Arm Bearings are both facing the flight direction (see Details B and C in Figure 2 below);

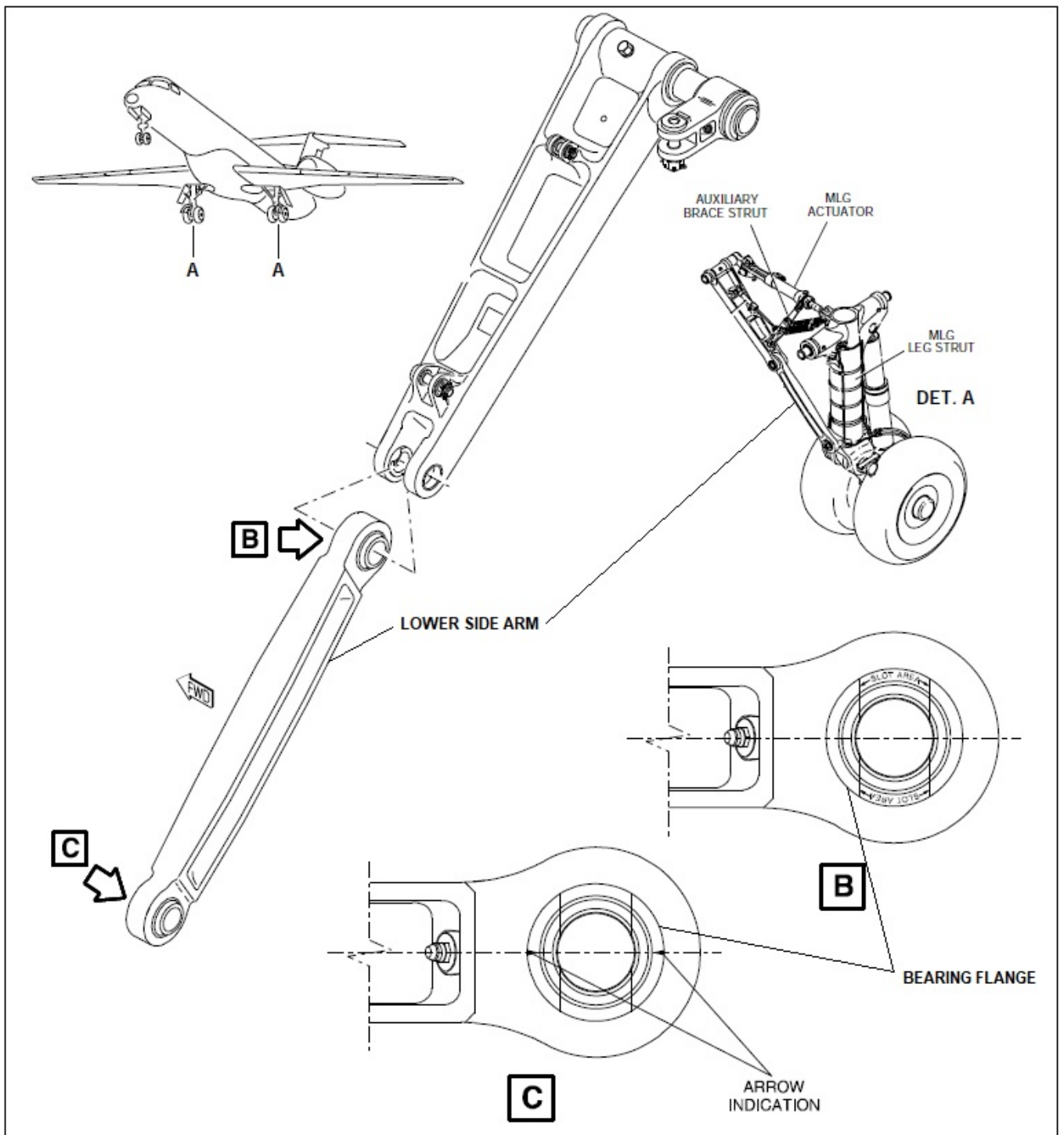


Figure 2: Correct installation of the Lower Side Arm Bearings

- i. If, during the inspection required by item (a)(2) above, it is found that either of the Bearing's flanges is installed inverted (flange facing opposite to the flight direction), before the next flight (see NOTE 2), remove the Lower side Arm and re-install the affected Bearing in the correct position (flange facing the flight direction). To comply with this paragraph, refer to procedure 32-10-03/400 (MAIN-LANDING-GEAR MAIN BRACE STRUT - REMOVAL/INSTALLATION) of the AMM applicable to the aircraft, and to the CMM (Component Maintenance Manual), procedure T.P. 145/1190\_32-10-03, as necessary.
3. Verify that there is no migration of both Bearings of the MLG Side Arm (see Details B and C in Figure 2) (both Flanges shall be flushed with the MLG Lower Side Arm face);

- i. If, during the inspection required by item (a)(3) above, it is found that has been migration of either of the Bearings, before the next flight (see NOTE 2), remove the Lower Side Arm and re-install or replace, as applicable, the affected Bearing. To comply with this paragraph, refer to procedure 32-10-03/400 (MAIN-LANDING-GEAR MAIN BRACE STRUT - REMOVAL/INSTALLATION) of the AMM applicable to the aircraft, and to the CMM (Component Maintenance Manual), procedure T.P. 145/1190\_32-10-03, as necessary.

#### **Parts installation**

(b) After the effectivity date of this AD, do not install any MLG Lower Side Arm that is not a serviceable part (see NOTE 1).

#### **Manufacturer notification**

(c) If any discrepancy is found as a result of the inspections contained in paragraph (a) of this AD, the details involved shall be communicated, within 120 hours of the finding, to:

1. ANAC – Agência Nacional de Aviação Civil through the contact information listed at the end of this AD;
2. Yaborã Indústria Aeronáutica S.A. / Embraer – Empresa Brasileira de Aeronáutica S.A.

Fleet Performance & Reliability team

Embraer Services & Support

Avenida Brigadeiro Faria Lima, no 2170, Putim

CEP 12227-901 - São José do Campos - SP

Tel.: +55 (12) 3927-1000;

emails: [fleet.performance@embraer.com.br](mailto:fleet.performance@embraer.com.br); [fleet.reliability@embraer.com.br](mailto:fleet.reliability@embraer.com.br)

#### **Material Incorporated by Reference in this AD**

(d) ELEB Component Maintenance Manual with Illustrated Parts List (CMM) – Main Side Strut, procedure T.P. 145/1190\_32-10-03, Revision 16, dated November 29, 2019, or later approved revisions.

#### **Alternative methods of compliance (AMOCs)**

(e) A different method or a different compliance time to the requirements of this AD may be used if approved by the Technical Manager of the Continuing Airworthiness Technical Branch (GTAC).

#### **CONTACT:**

For additional technical information, contact:

National Civil Aviation Agency (ANAC)

Continuing Airworthiness Technical Branch (GTAC)

Rua Dr. Orlando Feirabend Filho, 230 - Centro Empresarial Aquarius - Torre B - Andares 14 a 18, Parque Residencial Aquarius

CEP 12246-190– São José dos Campos - SP, BRAZIL.

Tel: +55 (12) 3203-6600; E-mail: [pac@anac.gov.br](mailto:pac@anac.gov.br)

**APPROVAL:**

Original in Portuguese language available at the Continuing Airworthiness Technical Branch (GTAC) of the National Civil Aviation Agency (ANAC). Signed by:

ROBERTO JOSÉ SILVEIRA HONORATO  
Superintendent  
Department Of Airworthiness (SAR)  
ANAC

---

**Referência:** Processo nº 00066.023772/2020-15

SEI nº 5406282



AGÊNCIA NACIONAL DE AVIAÇÃO CIVIL – BRAZIL

## BRAZILIAN AIRWORTHINESS DIRECTIVE

### ERRATA

AD No: 2021-02-02

Effective Date: 26 Feb. 2021

**AD No. 2021-02-02 - YABORÃ / 39-1478.**

\_This Errata is issued to correct printing errors in the original English version of this Airworthiness Directive.

Correction 1 of 7: Since Yaborã is the Type Certificate Holder for all the aircraft models listed in the applicability of the AD, the reference to Embraer in the manufacturer identification in the AD header was incorrect and thus removed. The text "... - YABORÃ/EMBRAER / 39-1478." was corrected to "... - YABORÃ / 39-1478.". The complete reference is as follows:

-----  
**AD No. 2021-02-02 - YABORÃ / 39-1478.**  
-----

Correction 2 of 7: Since Yaborã is the Type Certificate Holder for all the aircraft models listed in the applicability of the AD, the reference to Embraer in the APPLICABILITY section was incorrect and thus removed. The text "... Yaborã Indústria Aeronáutica S.A. / Embraer – Empresa Brasileira de Aeronáutica S.A. models..." was corrected to "...Yaborã Indústria Aeronáutica S.A. aircraft models...". The corrected text is as follows:

-----  
**APPLICABILITY:**

This Airworthiness Directive is applicable to Yaborã Indústria Aeronáutica S.A. aircraft models EMB-145, EMB-145ER, EMB-145EU, EMB-145EP, EMB-145LR, EMB-145MR, EMB-145LU, EMB-145MP, EMB-145MK, EMB-145XR, EMB-135BJ, EMB-135ER, EMB-135KE, EMB-135KL and EMB-135LR, all serial numbers.

-----  
Correction 3 of 7: The P/Ns listed as serviceable parts in NOTE 1, in the REQUIRED ACTION section, were incorrect. The text "... Arm (P/Ns 2309-2532-001 or 2309-2532-003) is one that..." was corrected to "... Arm (P/Ns 2309-2510-501, or 2309-2510-503, or 2309-2510-505) is one that...". The corrected text is as follows:

**REQUIRED ACTION:**

...

NOTE 1: A serviceable MLG Lower Side Arm (P/Ns 2309-2510-501, or 2309-2510-503, or 2309-2510-505) is one that has both grease fittings installed on the same side of the part (see Figure 1).

-----

Correction 4 of 7: The reference to the Aircraft Maintenance Manual (AMM) in the COMPLIANCE section, paragraphs (a)(1)(i), (a)(1)(ii) and (a)(2)(i), was to a specific customized manual and thus incorrect. The reference was corrected to reflect all the applicable AMMs. The reference to the applicable procedure of the Component Maintenance Manual (CMM) was also added.

- In paragraph (a)(1)(i), the text "... (see NOTE 1), according to the instructions of the AMM (Aircraft Maintenance Manual), procedure MPP1124\_32-10-03-04-1;" was corrected to "... (see NOTE 1). To comply with this paragraph, refer to procedure 32-10-03/400 (MAIN-LANDING-GEAR MAIN BRACE STRUT - REMOVAL/INSTALLA-TION) of the AMM applicable to the aircraft, and to the CMM (Component Maintenance Manual), procedure T.P. 145/1190\_32-10-03, as necessary;".
- In paragraph (a)(1)(ii), the text "... Figure 1), according to the instructions of the AMM, procedure MPP1124\_32-10-03-04-1." was corrected to "... Figure 1). To comply with this paragraph, refer to procedure 32-10-03/400 (MAIN-LANDING-GEAR MAIN BRACE STRUT - REMOVAL/INSTALLA-TION) of the AMM applicable to the aircraft, and to the CMM (Component Maintenance Manual), procedure T.P. 145/1190\_32-10-03, as necessary.".
- In paragraph (a)(2)(i), the text "... flight direction), according to the instructions of the AMM, procedure MPP1124\_32-10-03-04-1." was corrected to "... flight direction). To comply with this paragraph, refer to procedure 32-10-03/400 (MAIN-LANDING-GEAR MAIN BRACE STRUT - REMOVAL/INSTALLA-TION) of the AMM applicable to the aircraft, and to the CMM (Component Maintenance Manual), procedure T.P. 145/1190\_32-10-03, as necessary.".

The corrected text to this requirement is as follows:

-----

**COMPLIANCE:**

...

(a)...

1. ...

- i. If, during the inspection required by item (a)(1) above, it is found that the grease fittings are installed on opposite sides of the MLG Lower Side Arm (one grease fitting on one side and the other on the opposite side), before the next flight (see NOTE 2), replace the MLG Lower Side Arm by a serviceable part (see NOTE 1). To comply with this paragraph, refer to procedure 32-10-03/400 (MAIN-LANDING-



GEAR MAIN BRACE STRUT - REMOVAL/INSTALLATION) of the AMM applicable to the aircraft, and to the CMM (Component Maintenance Manual), procedure T.P. 145/1190\_32-10-03, as necessary;

- ii. If, during the inspection required by item (a)(1) above, it is found that both grease fittings are facing opposite to the flight direction, before the next flight (see NOTE 2), remove the Lower Side Arm and re-install it on the correct position (both grease fittings facing the flight direction – see Figure 1). To comply with this paragraph, refer to procedure 32-10-03/400 (MAIN-LANDING-GEAR MAIN BRACE STRUT - REMOVAL/INSTALLATION) of the AMM applicable to the aircraft, and to the CMM (Component Maintenance Manual), procedure T.P. 145/1190\_32-10-03, as necessary.

2. ...

...

- i. If, during the inspection required by item (a)(2) above, it is found that either of the Bearing's flanges is installed inverted (flange facing opposite to the flight direction), before the next flight (see NOTE 2), remove the Lower side Arm and re-install the affected Bearing in the correct position (flange facing the flight direction). To comply with this paragraph, refer to procedure 32-10-03/400 (MAIN-LANDING-GEAR MAIN BRACE STRUT - REMOVAL/INSTALLATION) of the AMM applicable to the aircraft, and to the CMM (Component Maintenance Manual), procedure T.P. 145/1190\_32-10-03, as necessary.

-----

Correction 5 of 7: The reference to the Aircraft Maintenance Manual (AMM) was missing in the COMPLIANCE section, paragraph (a)(3)(i), and was included. The text "... affected Bearing, according to the criteria/instructions of the CMM, procedure T.P. 145/1190\_32-10-03." was corrected to "... affected Bearing. To comply with this paragraph, refer to procedure 32-10-03/400 (MAIN-LANDING-GEAR MAIN BRACE STRUT - REMOVAL/INSTALLATION) of the AMM applicable to the aircraft, and to the CMM (Component Maintenance Manual), procedure T.P. 145/1190\_32-10-03, as necessary."

The corrected text to this requirement is as follows:

-----

**COMPLIANCE:**

...

(a)...

1. ...

i. ...

ii. ...

2. ...

...

i. ...

3. ...

- i. If, during the inspection required by item (a)(3) above, it is found that has been migration of either of the Bearings, before the next flight (see NOTE 2), remove the Lower Side Arm and re-install or replace, as applicable, the affected Bearing. To comply with this paragraph, refer to procedure 32-10-03/400 (MAIN-LANDING-GEAR MAIN BRACE STRUT - REMOVAL/INSTALLATION) of the AMM applicable to the aircraft, and to the CMM (Component Maintenance Manual), procedure T.P. 145/1190\_32-10-03, as necessary.

-----

Correction 6 of 7: The Yaborã contact information in section **Manufacturer notification**, paragraph (c)(2), was incorrect and was updated. The corrected text to this requirement is as follows:

-----

#### **Manufacturer notification**

(c)...

1. ...

2. Yaborã Indústria Aeronáutica S.A. / Embraer – Empresa Brasileira de Aeronáutica

S.A.

Fleet Performance & Reliability team

Embraer Services & Support

Avenida Brigadeiro Faria Lima, no 2170, Putim

CEP 12227-901 - São José do Campos - SP

Tel.: +55 (12) 3927-1000;

emails: [fleet.performance@embraer.com.br](mailto:fleet.performance@embraer.com.br); [fleet.reliability@embraer.com.br](mailto:fleet.reliability@embraer.com.br)

-----

Correction 7 of 7: Since the AMM - MPP (Maintenance Practices and Procedures) is a customized manual, the reference to it in section **Material Incorporated by Reference in this AD**, paragraph (d), was removed. The subsequent paragraphs were renumbered as a consequence of this removal. The corrected text to this requirement is as follows:

-----

#### **Material Incorporated by Reference in this AD**

~~(d) Embraer Aircraft Maintenance Manual (AMM), Maintenance Practices and Procedures, MPP1124\_32-10-03-04-1, Revision 0, dated March 09, 2020, or later approved revisions.~~

(d) ELEB Component Maintenance Manual with Illustrated Parts List (CMM) – Main Side Strut, procedure T.P. 145/1190\_32-10-03, Revision 16, dated November 29, 2019, or later approved revisions.

...

-----

Please modify the original AD text and attach this Errata to it.

**APPROVAL:**

ROBERTO JOSÉ SILVEIRA HONORATO  
Airworthiness Superintendent  
ANAC

**NOTE:** Original in Portuguese language signed and available in the files of the Continuing Airworthiness Technical Branch (GTAC) of the Brazilian National Civil Aviation Agency (ANAC).

---

**Referência:** Processo nº 00066.023772/2020-15

SEI nº 5406284