

МІНІСТЕРСТВО ОСВІТИ І НАУКИ УКРАЇНИ

НАЦІОНАЛЬНИЙ АВІАЦІЙНИЙ УНІВЕРСИТЕТ

**КАФЕДРА ПІДТРИМАННЯ ЛЬОТНОЇ ПРИДАТНОСТІ ПОВІТРЯНИХ
СУДЕН**

ДОПУСТИТИ ДО ЗАХИСТУ

Завідувач кафедри

Канд. Техн. наук, док

_____ О. В. Попов

«___» _____ 2022 р.

КВАЛІФІКАЦІЙНА РОБОТА

(ПОЯСНЮВАЛЬНА ЗАПИСКА)

ЗДОБУВАЧА ОСВІТНЬОГО СТУПЕНЯ

«МАГІСТР»

ЗА ОСВІТНЬО-ПРОФЕСІЙНОЮ ПРОГРАМОЮ

**«ТЕХНІЧНЕ ОБСЛУГОВУВАННЯ ТА РЕМОНТ ПОВІТРЯНИХ СУДЕН І
АВІАДВИГУНІВ»**

**Тема: «Модифікація конструкції ПС транспортної категорії при виконанні
капітального ремонту»**

Виконав: _____ **Мохамед Ахмед**

Керівник: канд. техн. наук, доц. _____ **В.О. Юрій Іванович
Смірнов**

Консультанти з окремих розділів пояснювальної записки:

Охорона праці: канд.біол.наук, _____ **В. В. Коваленко**
доц.

Охорона навколишнього _____ **Т. В. Сасенко**
середовища:

д-р пед. наук, проф.

Нормоконтролер _____

Київ 2022

MINISTRY OF EDUCATION AND SCIENCE OF UKRAINE

NATIONAL AVIATION UNIVERSITY

AIRCRAFT CONTINUING AIRWORTHINESS DEPARTMENT

PERMISSION FOR DEFEND

Head of the Department

Ph.D., Assoc. Professor.

_____ O. V. Popov

«__»_____ 2022 p.

Qualifying WORK

(EXPLANATORY NOTE)

GRADUATE EDUCATIONAL DEGREE

«MASTER»

FOR EDUCATIONAL-PROFESSIONAL PROGRAM

«MAINTENANCE AND REPAIR OF AIRCRAFT AND AVIATION ENGINES»

Theme: «Modification of the design of the transport category aircraft during the overhaul »

Performed by: _____ **Mohamed Ahmed**

Supervisor: Ph.D. in _____ **V. O. Yuri Vanovich**

Technology, Associate **Smirnov**

Professor, Senior researcher

Consultants from separate sections of the explanatory note:

Labour precaution advisor: _____ **V. V. Kovalenko**

Ph.D., Assoc. Professor

Environmental protection _____ **T. V. Sayenko**

advisor: Ed.D., Professor

Standards Inspector _____

Kyiv 2022

NATIONAL AVIATION UNIVERSITY

Faculty: Aerospace faculty

Aircraft Continuing Airworthiness Department

Educational and Qualifications level: «Master Degree»

The specialty: 272 «Aviation transport»

Educational-professional program «Maintenance and Repair of Aircraft and Engines»

APPROVED BY

Head of the department

Ph. D., Assoc. Professor

_____ O. V. Popov

«___» _____ 2022

Graduate Student's Degree Work Assignment

Mohamed Ahmed

Topic: "**Modification of the design of the transport category aircraft during the overhaul**"

1. The Thesis theme: « **Modification of the design of the transport category aircraft during the overhaul** ». Approved by the Rector's order of 11 October, 2022 № 2196/CT.
2. The work fulfillment terms: since October 25, 2022 until December 31, 2022.
3. Initial information for work: Searching for analysis of An-32 and Environmental trends in aviation to 2050 and searching about time between overhaul.
4. The substance of the logical observe: improvement of measures for work and natural security.
5. List of mandatory graphic material: Analysis of An-32. The optimum overhaul time calculation in RGA and calculation, Overhaul process, Aviation and the Environment by using the material was made utilizing Microsoft Office Excel, Microsoft Office Power Point and introduction as introductions.

6. Schedule of Graduation Work Performing:

Stages of Graduations Work completion	Stages Completion Date	Remarks on completion
Analysis of An-32	25.10.2022 - 28.10.2022	
Structure and Construction examples of tunnel reinforcement	29.10.2022 - 30.10.2022	
Overhaul Methods	01.11.2022 - 08.11.2022	
Safety considerations and strategies for overhaul	09.11.2022 - 15.11.2022	
Environment trends in aviation to 2050	16.11.2022 - 20.11.2022	
Labor Protection, Environment Protection	21.11.2022 - 30.11.2022	
Explanatory note checking, editing and correction	16.12.2022 - 18.12.2022	

7. Advisers on individual sections of the work (Thesis):

Section	Adviser	Date, Signature	
		Assignment Delivered	Assignment Accepted
Labor protection	Ph.D., Associate Professor Ekaterina Ivanovna Kazhan		
Environmental protection	Ed.D., Professor Lesia Pavlyukh		

8. Assignment issue date _____

Graduate Project Supervisor _____
(Supervisor signature)

V. O. Yuri vanovich Smirnov

Assignment is accepted for performing:

Graduate student _____
(Graduate student's signature)

Mohamed Ahmed

ABSTRACT

Informative note to the diploma work {Modification of the design of the transport category aircraft during the overhaul}.

99 Pages, 23 Figure, 6 tables

The diploma draft is considered of overhaul process such as reliability.

The purpose and observed of the explorations are to provide the usefulness and scientific applications of the overhaul process. Purpose of the qualification work is to improve the quality and efficiency of the overhaul and the system management.

For each part of our work has observe and conclusion and in the end of our work we have the conclusion of full our work.

The basic principle of this qualification work is to ensure that the output data is an influence on the flying experience nowadays.

The method for ensuring the effects will be described by the principle of overhaul process.

Qualification work materials are recommended to use in educational process and practical activity of specialists of development laboratory.

KEYS WORD: AIR CONDITION, INTER COMMUNICATION, LOCAL AIR QUALITY, INDIA AIR FORCE, MUNICIPAL SOLID WASTE, TIME BETWEEN OVERHAL, LIFE CYCLE ASSESSMENT.

CONTENT

LIST OF ABBREVIATIONS, DESIGNATIONS, SYMBOLS	8
INTRODUCTION	9
Part 1. Analysis an-32	11
1.1 Introduction.....	11
1.2 General Information and Safety Precautions	14
1.3 Brief description of aircraft	15
1.4 Flight and Navigation Equipment.....	19
1.5 Ground service and maintenance practices	21
Conclusion to part 1	24
Part 2. Structure and Construction Examples of Tunnel Reinforcement Method Using Thin Steel Panel	25
2.1 Introduction.....	25
2.2 Characteristics of the New Tunnel Reinforcement	26
Conclusion to part 2	32
Part 3. Overhaul methods	33
3.1 Introduction.....	33
3.2 Optimization of the overhaul method	35
3.3 Time between overhaul	40
Conclusion to part 3	43
Part 4. Safety concerns and strategies for overhaul	44
4.1 Introduction.....	44
4.2 Safety concerns	45
4.3 Harmful and dangerous production factors for craft technician per the quality ГОСТ 12.0.003-74CCTБ	47
4.4 Measures to cut back the impact of harmful and dangerous production factors	50
4.5 Responsibilities of the operator before beginning the elevate operation	53
Conclusion to part 4.....	56

Part 5. Aviation and the therefore the surroundings.....	57
5.1 Introduction.....	57
5.2 Environmental trends in aviation to a pair of 2050	58
5.3 Contribution of other Fuels to Trends Assessment	62
Conclusion to part 5	69
Part 6. Labour Protection	70
Conclusion to part 6.....	79
Part 7. Environment Protection	80
Conclusion to part 7	84
APPENDIX.....	85
QUALIFYING CONCLUSION	91
REFERENCES	93

LIST OF ABBREVIATIONS, DESIGNATIONS, SYMBOLS

In this part short list of abbreviations and designations is given, which are used in calculations of qualification work and also main terms, which are used in text of explanatory note:

IAF	Indian Air Force
ICAO	International Civil Aviation Organization
CORSIA	Carbon Offsetting and Reduction Scheme for International Aviation
CAEP	Committee on Aviation Environmental Protection
LAQ	Local Air Quality
AJF	Alternative jet fuel
LCA	Life Cycle Assessment
CAGR	Compound Average annual Growth Rate
NTSB	National Transportation Safety Board
SAA	State Aviation Administration
PPE	Personal Protective Equipment
EASA	European Aviation Safety Agency
CAEP	Committee on Aviation Environmental Protection
AMB	Aircraft Maintenance Base
ACS	Air conditioning System
ICS	Inter Communication System
TBO	Time Between Overhaul
MSW	Municipal Solid Waste

INTRODUCTION

Taking into the specific equipment of the enterprise, the capabilities of the employees, the satisfactory participation in the redesign and modernization of the aircraft of the "An-32" type of the enterprise, it should be seen that, starting around 1992:

- A complete example of the updated An-32 aircraft has been developed and revised.
- According to the engineer's document, work and control were carried out on the management modernization complex of the An-32 aircraft.

In June 2009, an An-32 aircraft linked to Monday's incident disappeared while en route to a similar area containing an advanced landing site at Mechuka, with 13 people on standby.

After a fierce pursuit, the wreckage of the plane was found 25 kilometers away from the arrival area, and all 13 people on board were killed in the accident.

The body parts of the group were found around the wreckage of the damaged plane, H. Lain, then Assistant Police Superintendent, told PTI by phone from Central Command at the scene in West Siang.

In dismantling the condition of Air India's military An-32 aircraft, there is ample motivation to recognize that in order to ensure practical endurance and flight safety, the customer has consciously accepted the challenge of repairing an aircraft that is actually at the customer's base repaired.

Considering the real specific condition of these aircraft, which entered service around 1984, and the special capabilities that ensured the company's maintenance and modernization, as well as the customer's creation, sending the An-32 was a positive topic for the aircraft repair company's subsequent final repair at the customer's base.

The use of the PKZH-3000 robot control board in the assembly interaction, setup and control of the electric pulley during the repair and modernization of the An-32.

An Indian Air Force Antonov AN-32 with 13 personnel on board has crashed near Mechuka in the West Xiang district of Arunachal Pradesh, bearing striking resemblance to the transport plane crash at the same location 10 years ago place. people on board.

According to preliminary information, AN-32 went missing on Monday around 1 p.m. route to the advanced landing site in Mechuka. Sources said the plane was about 30 kilometers from the landing site when it disappeared from radar.

The results of the assessment of the actual technical condition of the aircraft arriving for maintenance have shown that, for objectively interpretable reasons, a large number of serious deficiencies in structural systems and components have not been completely eliminated or prevented during previous repairs at the customer premises, a large number of these repairs.

Lack of overhaul experience, a sufficient number of qualified personnel, complete quality system documentation, equipment, spare parts and technical skills are not sufficient to fully perform high quality repairs.

Expansion of participation in the production of additional components for An-26 aircraft registered with the European An-32 Aircraft Association, issuance of individual innovation international IDs and confirmation of unusual assembly processes.

PART 1. ANALYSIS OF AN-32

1.1 Introduction

The An-32 multipurpose medium transport aircraft is used for short- and medium-range transport, landing and landing of troops and cargo, and air transport of the wounded and sick.

The aircraft can operate in any climate, including hot climates, day and night from high-altitude airports, and inclement weather conditions (IMC).

The crew consists of the captain, co-pilot and navigator. The crew is housed in a separate sealed flight compartment.

A sealed cargo/passenger compartment with controlled air temperature enables the aircraft to be used for air transport of perishable cargo. Air conditioning and side-mounted folding seats provide ample conditions for troop transport.

The aircraft is equipped with a fixed crew oxygen unit and a two-person portable oxygen unit in the cargo hold for use during cabin decompression.

The aircraft carries handling instrumentation with a lifting capability of up to 3000 kgf (30,000 N) and clastic roller track for loading, unloading and moving the cargoes within the craft. The extractor parachutes guarantee withdrawal of the product from the craft throughout Para dropping.

The craft is supplied with radio communication, navigation and flight-navigation instrumentation sanctioning day, night and IMC flights.

The An-32 heavier-than-air craft Maintenance contains the data needed for performing arts the upkeep of the heavier-than-air craft, connected systems, units, accessories and instrumentation.

The upkeep covers description of the heavier-than-air craft structure, bother shooting, and heavier-than-air craft maintenance practices.

The scope and intervals of the maintenance operations square measure given within the heavier-than-air craft Maintenance Schedule (AMS).

Instruction for in-flight operation of the craft systems and instrumentation square measure given within the craft Flight Manual (AFM).

Once performing arts maintenance of the seller things, far from the heavier-than-air craft as educated within the heavier-than-air craft Maintenance Schedule, consult the operation and maintenance publications equipped the seller things.

All the data contained in every Section is sub-divided into Sub-Sections and Subjects.

The pagination and date of issue square measure placed beneath the Section (Sub-Section, Subject) variety.

The data lined within the Maintenance Manual is sub-divided into the subsequent topics with the individual.

General info and Safety Precautions:

The set of apparatus needed for lifting the heavier-than-air craft consists of 2 main and one nose hydraulic jacks and a try of wheel amendment hydraulic jacks.

Listed below square measure variants of usage of the lifting equipment:

The whole set of hydraulic jacks. In thus doing, the 2 main jacks square measure placed beneath the wing center section jacking purposes and also the nose jack is placed beneath the body jacking point.

The one nose hydraulic jack. In thus doing, the jack is placed beneath the body jacking purpose and chocks square measure placed beneath the most LG wheels.

The try of wheel amendment hydraulic jacks with the beam for replacement of the LG wheels. In thus doing, the beam and also the 2 hydraulic jacks square measure placed beneath one in all the most LG units or beneath the nose LG unit.

With the wheel amendment hydraulic jacks being put in beneath one in all the most LG units the chocks ought to be placed beneath the opposite main LG units. With the wheel amendment hydraulic jacks being put in beneath the nose.

LG unit the chocks ought to be placed beneath each main LG wheels.

It's allowed to raise the heavier-than-air craft of the utmost gross weight and with any CG positions inside the operational CG limits either by hydraulic jacks or by machine amendment hydraulic jacks with the beam provided the heavier-than-air craft is put in on a surface capable of withstanding specific pressures not but 5 kgf/sq .cm (0.5 MPa), each paved and unpaved road.

What percentage Antonov will Republic of India have?

Indian Air Force: Bought one hundred twenty-five craft, a hundred and five square measure still in commission. Entire fleet is undergoing modernization; thirty-five upgraded An-32s are delivered by Ukrspesexport.

Note:

Ukrspesexport- Is a Ukrainian state-owned arms commerce company and a part of the state -owned Ukrainian Defense trade conglomerate.

UKRSPECEXPORT was established in Gregorian calendar month 1996 as a result of the merger of Ukroboron service and Ukrinmash. It's a subsidiary of Ukroboronporm.

1.2 General Information and Safety Precautions

The arrangement of substances required for lifting the plane includes of 2 basic and one nose water driven jacks and a few of wheel amendment pressure driven jacks.

Recorded beneath square measure variations of utilization of the lifting gear:

The entire arrangement of water driven jacks. during this manner, the 2 primary jacks square measure set beneath the wing community space jacking focuses and also the nose jack is about beneath the body jacking purpose.

The one nose water driven jack. During this manner, the jack is put under the fuselage body jacking purpose and chocks square measure set under the first LG wheels.

The try of wheel amendment water driven jacks with the pillar for substitution of the LG wheels. The pillar also and the two pressure driven jacks are put under one in all the first LG units or under the nose LG unit.

With the wheel amendment water driven jacks being introduced less one in all the elemental LG units the chocks have to be compelled to be anesthetize the opposite principal LG units. With the wheel amendment water hopped-up jacks being introduced beneath the nose LG unit the chocks have to be compelled to be anesthetize each principles LG wheels.

It's permissible to raise the plane of the foremost extreme awful weight and with any CG positions within the purposeful CG restricts either by water driven jacks or by machine amendment pressure driven jacks with the bar gave the plane is introduced on a surface equipped for enduring specific tensions at the terribly least 5 kgf/sq .cm (0.5 MPa), each cleared and unpaved street.

1.3 Brief description of aircraft

Aircraft system:

The undercarriage of the aircraft is trike and retractile. It permits the aircraft to be operated from unpaved airfields with soil strength of a minimum of half dozen 6 kgf/m^2 .

(0.6 MPa). main undercarriage units square measure put in within the engine enclosure LG compartments whereas one nose undercarriage unit within the body LG well beneath the flight compartment floor.

The aircraft landing gear is supplied, with the subsequent systems:

LG retraction/extension system providing LG forward retraction LG extension and LG up or down protection. Nose LG wheel mechanism providing the nose wheel steering through associate degree associate degreeless of $45^\circ \pm 2^\circ$ leftward or rightward throughout taxiing and through an angle of $10^\circ \pm 1^\circ$ throughout take-off or landing.

Main LG wheel braking system providing a joint or separate braking of the wheels in traditional, emergency or parking braking.

The fire protection system:

The hearth protection system of the craft is meant to observe, warn and extinguish hearth within the engine nacelles within the APU and wing compartments, and within the engines.

Hearth is destroyed by suggests that of a stationary hearth ending system comprising the hearth extinguishers of main discharge, that square measure operated mechanically or manually, and people of alternate discharge operated manually. the hearth detection is automatic. the hearth warning is lightweight and aural.

With the exception of the active hearth ending suggests that, applied within the craft is that the fire-preventive and fire-non spreading style of its units and elements.

The air con system:

Bleeds air from the engines and provides it to the flight and product compartments with automatic management of the rate of flow, distributes air between the flight and product.

Compartment, heats (cools) the compartment air mechanically maintaining a planned temperature, air-heats the flight compartment windscreen and windows, ventilates the compartments with region air on the bottom, warms the feet of the crew members, mechanically controls the atmospheric pressure within the pressurized cabin in line with a planned program, mechanically maintains the planned rate of the cabin pressure amendment, pressurizes and depressurizes the flight and product compartments with relevance the planned absolute pressure, mechanically maintains the planned pressure differential values, depressurizes the flight and product compartments in emergency and reduces the pressure differential.

The ice protection system:

Prevents formation of ice at any temperature right down to -20°C on the subsequent elements of the aircraft; the wing, the tail unit, the engine air intakes, the propellers, the windscreen, the blister, the pilot static tubes, the pressure differential device, the angle-of-attack transmitter, the ice detector. The ice protection is provided by air- or electrical heating of the craft numerous elements, or by applying the de-icing liquid.

The wing and tail-unit ice protection systems are mechanically switched on in response to the signal from the ice detector, or manually: the ice protection operation of the opposite elements of the craft is merely manual. The switch of the whole craft ice protection system is merely manual.

The fuel system:

The equipment of the craft is meant for the fuel provide of the engines and also the auxiliary electromagnetic unit. It includes fuel tanks, tank vent system, single- purpose supply system, fuel usage system. The engines care for the fuels PT, T-1, T-2, TC-1 and their mixtures.

The craft is oil-fired either through the single-point supply system or through the filler necks provided on every tank. The tank fuel usage procedure is three-stage.

Within the course of consumption, the fuel is transferred to the third fuel consumed tanks by transfer pumps and more to the engines by booster pumps. If the pumps of the third fuel consumed tanks fail, the fuel can ensue the primary and second fuel consumed tanks to the engines by gravity. The auxiliary electromagnetic unit are often fed with fuel from any tank.

The oxygen system equipment:

Put in within the aircraft controls oxygen provide to the crew members at their stations and ones they walk round the aircraft compartments. The instrumentation comprises:

- Two stationary oxygen bottles with a capacity of 10, l every and a pressure of 150 kgf/m^2 (15 MPa).
- Three sets of oxygen regulators together with parachute oxygen regulative.
- Two transportable oxygen regulators with a pressure of 30 kgf/m^2 (3MPa).

Used at the utmost rate of flow, the stationary bottles oxygen capacity can serve to feed the three crew members for two hours. The transportable oxygen regulator is meant to produce one person with oxygen for a mount of 15 to 40 min, that depends on the cabin altitude.

The ambulance equipment:

The automobile instrumentation is put in in tjae heavier-than-air craft, is meant for accommodation and transportation of 24 stretcher cases or 50 sick and wounded on seats within the product compartment. The stretcher cases square measure transported in customary stretchers the handles of that square measure secured in upright locks and in baud rate loops, whereas those sick and wounded that square measure able to sit square measure transported on side-mounted seats.

The fuselage:

The body of the aircraft is associate degree all-metal semi-monologue with a longitudinal framework of stringers and beams, a cross framework of 48 frames and a stressed skin.

The fuselage falls into three major production parts, i.e., nose section - up to frame No. 11« center section - from frame No. 11 to frame No. 33, and tail section - from frame No. 33. The nose section is provided with a tillable nose cone. At the bottom of the fuselage between frames Nos 1 and 4 there is a well for the hose landing gear.

A wing center section is attached to the top of the fuselage center section (strong frames Nos 17 and 20). A cargo door is located in the tail section of the fuselage between frames Nos 33 and 40. The tail unit is attached to strong frames Nos 40, 43, and 45.

1.4 Flight and Navigation Equipment

The flight and route hardware of the heavier-than-air craft incorporates pressure, electrical, rotating mechanism and electronic instruments that offer flight and route knowledge.

The strain instruments incorporate the rate pointers and speed cautioning gadgets, altimeters and also the Ernst Mach meter.

The autopilot is meant for programmed height hold of the heavier-than-air craft as for its 3 primary tomahawks.

The flight chief framework is meant to figure with the heavier-than-air craft piloting by handling the information nonheritable from the route and flight gear and route and landing radio guides, and introducing the directional orders to the pilot.

The programmed approach and speed increase cautioning framework is meant to measure and show points of assault and vertical speed increase of the heavier-than-air craft and to attach with the sound and lightweight admonition frameworks and also the stick shaker once the heavier-than-air craft arrives at the most extreme allowable approach or greatest allowable speed increase.

The bottom section cautioning framework, contingent upon the flight condition and heavier-than-air craft setup, offers the team with visual and discernible admonition led to by the heavier-than-air craft quick conclusion with sharp landscape.

The compass framework provides heading and purpose of-turn knowledge, and, helped by the ADFS enticing and relative heading of a broadcast.

The flight director system is meant to facilitate the craft piloting by process the data obtained from the navigation and flight instrumentation and navigation and landing radio aids, and presenting the steering commands to the pilot.

Table 1.1-The aircraft carries the following flight and navigation equipment:

КУС-730/1100-1 airspeed indicator	2 pcs
RL/80/AM/MS/5 mechanical counter/ pointer altimeter	2 pcs
WL/1381/AM/MS/2 mechanical counter/pointer altimeter	1 pc
LAS indicator 160800000	1 pc
TAS indicator 160900000	1 pc
RL/1004/KMA/CPM/1 Mach meter	1 pc
ДА-30П rate-of-climb, turn and slip indicator	2 pcs
АП-28Л1И autopilot	1 set
ПРИВОД АНЭ flight director system	1 set
АУАСП-24КР-1 automatic angle-of attack and acceleration warning system	1 set
GPWS MARK 11 ground proximity warning system	1 set

458MKC, series 2, vertical gyro	2 pcs
АГБ-3К gyro horizon	1 pc
БК-53РІІІ erecting cut-out switch	3 pcs
ГМК-11Э compass system	1 set
УІІУ-2К bearing and heading indicator	1 pc
ССА-1-240 LAS switch	1 pc
АЧС-1М cloak	3 pcs
КІ-13К magnetic compass	1 pc

1.5 Ground service and maintenance practices

The present Section contains information necessary for the airplane line maintenance:

- Aircraft systems service.
- Braining fluids from aircraft systems.
- Airplane grounding.

External electric power offer affiliation.

Affiliation of external headsets to the plane Inter Communication System (ICS)

Fig. 201 shows the placement of the plane service points.

The plane construction permits associate operator to realize access to the bulk of service points directly from the bottom. Special ground instrumentality, however, ought to be wont to gain access to some hardly accessible points.

To forestall injury to the plane surface once service the highly-positioned points, the operator ought to stand solely within the space indicated and use special protecting footwear.

Table 1.2- the operator ought to stand solely within the space indicated and use special protecting footwear:

Description and designation	Purpose
T3-8-255Б (T3-22) fuel service truck.	To perform plane fuel tanks single-point pressure supplying or to fuel plane through its filler necks.
3СЖ-66М (3СЖ-66) special fluids service truck.	To fill АИ-20Д engine and ТГ-16М auxiliary electromagnetic unit oil tanks with oil and to refill hydraulic tanks with oil and to preserve the engines.
AK3C-75M-131-11 truck-mounted element charging unit.	To charge plane element bottles with respiratory element.
B3-20-350 air service unit.	To charge the plane hydraulic accumulators with air and to service the undercarriage.

АПА-50М mobile ground electromagnetic unit.	To provide the craft electrical system with AC and DC.
УПГ-250ГМ hydraulic take a look unit.	To see operation of the mechanism and to refill it with hydraulic fluid.
УМГ-350-131 (МГ-70) unified engine heater.	To heat engines at low close temperature.
5355А ground nonaggressive mechanical device.	To pressurize the compartments throughout leak tests.
КрА3-255Б towing truck.	To tow the plane.
СП0-15М mobile tower with a platform.	To realize access to the highly-positioned points throughout the plane ground service.
8Т-210 truck-mounted hoisting crane.	To get rid of and install the plane accessories.

Observes:

Totally different forms of vehicles could be used instead of those given within the List nonetheless their result boundaries need to adjust to those predefined-on top of.

With the plane motors operating, the help college ought doesn't stay within the plane propellers and stream flow freedom regions.

Conclusion to part 1

Considering the specialized hardware of the endeavor, the capabilities of the manpower, adequate involvement with the upgrade and modernization of plane of the "An-32" sort at the venture, it need to be noticed that, starting around 1992:

- A full pattern of update of An-32 airplanes has been discovered and dominated.
- Worked out and dominated the complicated of deals with modernization of An-32 plane as per the documentation of the Engineer.

Dismantlement the condition of the An-32 planes of the Indian Aviation primarily based military, there's full motivation to acknowledge that to ensure pragmatic endurance and flight security, the consumer deliberately accommodated the challenge to mend fix plane that had really been fixed at the Client's base.

Considering the authentic specific state of those planes, that are in real world beginning around 1984, equally because the specific capacities to ensure fix and modernization of the endeavor and also the foundation of the consumer, it need to be seen a positive subject of causing the An-32 planes for fix to the enterprise later the past fix at the Client's base.

PART 2. STRUCTURE AND CONSTRUCTION EXAMPLES OF TUNNEL REINFORCEMENT METHOD USING THIN STEEL PANEL

2.1 Introduction

In a few years ago problems with the substantial linings of passages, for instance, peeling breaking and disfigurement attributable to maturing, earthbound modification tremors or different within or outer variables have been accounted for from totally different of the country.

Along these lines, maintaining with and overseeing burrows on never-ending premise whereas inflicting the important fixes and support of their substantial linings to own become important undertakings each for the current and what is to come back.

Specifically, the upkeep methods that square measure applied to rail route associated street burrows ought to be to such an extent that the work is done firmly while not meddling with traffic since rail lines and streets square measure the chief in reconstruct for transportation.

2.2 Characteristics of the New Tunnel Reinforcement

Method:

Attributes and position of strategy.

During this strategy, boards product of plate (8 to 20+ mm) in thickness square measure applied to the internal surface of the passage to be designed up.

Their shapes square measure modified by employing a bar-like half to urge an appropriate hole between the board and also the current coating. on these lines, this support technique is applied to forestall peeling of considerable coating, limit ground unsettling influence figure a pair of 2.1:

The salient characteristics of this methodology square measure enumerated below.

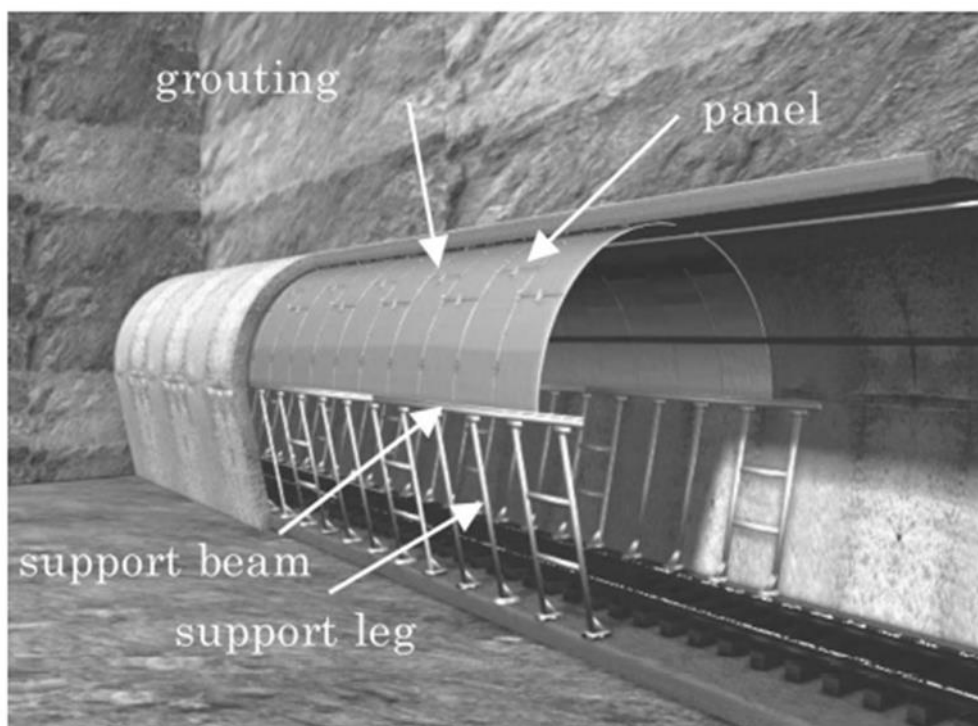


Figure 2.1. Image of basic structure

1. Speedy gathering work requiring no attachment activity: Since the get along of boards needs no attachment activity it tends to be done speedily even at twelve PM. In any event, throughout execution of the work, traffic through the passage is not blocked in any approach.

2. Prefab strategy: Since the boards square measure gathered by fitting together steel people pre-assembled at the assembly line, the preciseness of manufacture of people is high and also the field development work is done exactly Likewise.

3. Permanent support live: The detached style documented on top of is a lasting support measure once consumption neutralization fitting to the passage climate is applied to that.

4. Thin-walled structure: A support structure that's comprised of boards is worked into the best form as indicated by the present covering. on these lines, even wherever there's simply a decent house between the limitation limits of a structure and also the current coating, it's possible to {make} a small walled support lining which does not make the passage inward section modification essentially.

5. High yield strength: Since the support lining may be a detached arciform construction compelled to the present covering by grout stuffed within the middle of the steel board and also the current coating it's high come back strength all the same its restricted thickness.

The work execution technique when medium size board is applies to rail route burrow.

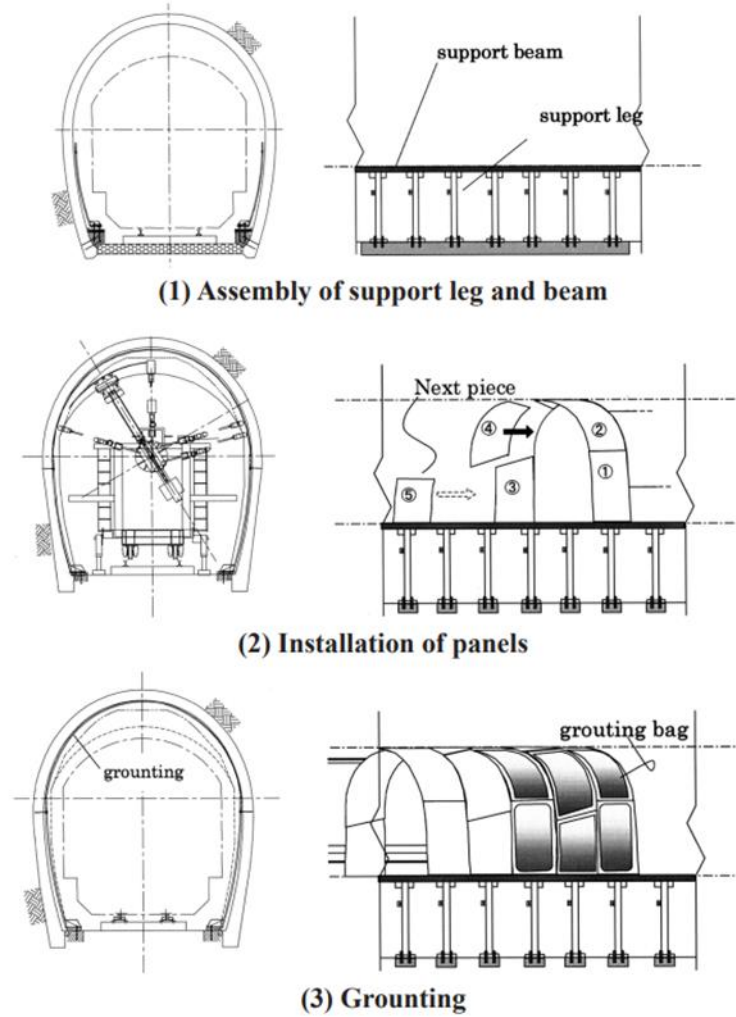


Figure 2.2. Installation method by elector machine

The board size is 8 to 20+ millimeter thickness 1,000 mm wide and a pair of 2,000 to 3,000 millimeter long.

A vehicle just like the fragment gathering vehicle used in a very safeguard burrow is used to gather the boards. it's provided with a board holding system. The machine licenses expedient gets along of the boards. At the purpose once the small board sorts square measure applied, they're gathered physically. during this approach, boards deliberation underneath 30 metric weight unit piece square measure used.

These boards square measure 8 millimeter thick 400 millimeter wide and 1,000 millimeter long. this type will adequately be applied to burrows that square measure insufficient to even accept permitting utilization of a development vehicle.

Determined to make your mind up the board support characteristic and also joint strength trademark, a stacking take a look at was semiconductor diode. the placement of the stacking takes a look at.

The take a look at items used were very little boards 8-millimeter plate thickness \times 400-millimeter width \times 1,000-millimeter circumferential lengths 4,200-millimeter steel plate external surface. From three rings of boards, a segment 1,000-millimeter width, 2,000-millimeter circumferential length was taken out and a variable concentrated burden was applied to its middle.

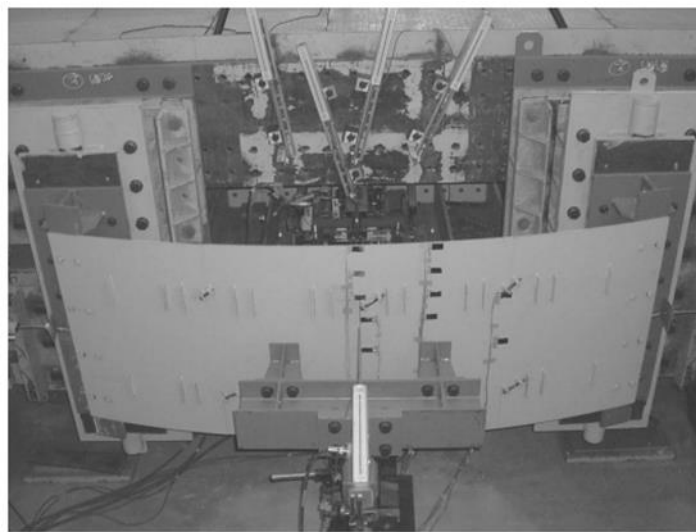


Figure 2.3 loading experiment

Sorts and methodology of the work:

Installation of panel support legs and beams:

At all-time low finish of the panel installation, a grooved beam into that the panel is fitted within the axial direction of the tunnel is put in as a panel-supporting member. once panels square measure to be put in solely within the higher a part of the tunnel section, support legs up to all-time low finish of the panel installation square measure erected on the bottom and a panel- supporting beam is put in on those support legs.

Once support legs square measure erected, empty grout baggage square measure antecedently placed behind them. when the panels square measure put in, grout is place into that baggage to fill the gap between the present and new linings.

Survey and design:

The cross-sectional form of associate existing tunnel is surveyed intimately by victimization associate optical vary finder or another appropriate instrument.

This is to work out the relative positions of the present lining and restriction boundary lines of adjacent buildings and to style a cross section of the panel installation that minimizes the decrease in tunnel cross section because of the reinforcement.

Grouting:

The gap between the panels and also the existing lining is full of grout either directly or by suggests that of baggage. within the latter case, a bag is connected to the rear of every panel before assembly and in the end the panels square measure put in, grout is injected into the luggage from the within of the panels through the grouting holes.

A normal cement-based grouting material whose spring stiffness is adequate or bigger than that of the encircling ground is employed. though direct grouting is that the norm, grouting by suggests that of baggage is also designated reckoning on conditions at the development web site. the benefits of victimization baggage for grouting square measure as follows:

1. Water that leaks from the liner is drained through the gaps between baggage.
2. Associate finish plate to prevent the flow of grout is omitted.
3. Grout doesn't effuse through cracks, etc. within the lining.
4. Since unseaworthy water doesn't combine with the grout, the grout quality is maintained for a chronic amount.

Relocation of wiring:

As so much as potential, the electrical wiring, communication/signal lines, lighting instrumentality, bimetallic supports, etc. that square measure put in within the tunnel lining ought to be removed or resettled quickly before commencement of the reinforcement work from the point of view of securing the protection of wiring and facilitating the work.

Restoration of wiring:

When the work is completed, the bimetallic supports square measure refitted to the panels and also the wiring, lighting instrumentality, etc. that are resettled quickly square measure reinstalled in their original positions.

Survey and design:

The cross-section form of associate existing tunnel is surveyed intimately by victimization associate optical vary finder or another appropriate instrument.

This is often to work out the relative positions of the present lining and restriction boundary lines of adjacent buildings and to style a cross section of the panel installation that minimizes the decrease in tunnel cross section because of the reinforcement.

CONCLUSION TO PART 2

Along these lines, maintaining with and overseeing burrows on never-ending premise whereas inflicting the important fixes and support of their substantial linings to own become important undertakings each for the current and what is to come back.

Specifically, the upkeep methods that square measure applied to rail route associated street burrows ought to be to such an extent that the work is done firmly while not meddling with traffic since rail lines and streets square measure the chief in reconstruct for transportation.

PART 3. OVERHAUL METHODS

3.1 Introduction

The overhaul method is Associate in Nursing overhaul perpetually includes a whole dismantling of the engine, thorough improvement and review of elements, repair of elements as required and disposal of defective elements.

Major things like the rotating shaft, housing and connecting rods area unit subject to special inspections.

Elements that area unit subjects of soundness Directives or Service Bulletins area unit usually replaced or repaired in accordance with the steps made public within the AD or bulletin.

Elements area unit measured for excessive wear and correct clearances. The allowable dimensions and clearances area unit given within the manufacturer's overhaul manual in 2 separate columns; one for manufacture (new) limits and one for service limits.

The service limits area unit larger and permit for looser fits than manufacture limits. Some outlets reconstruct engines supported manufacture limits, whereas others use service limits.

When is overhaul necessary?

The primary step within the overhaul method is crucial that Associate in Nursing engine will if truth be told want Associate in Nursing overhaul.

Several times since the last overhaul doesn't perpetually equate to desperate to overhaul Associate in Nursing engine.

Operators should de jure befits engine manufacturers' suggested times between overhauls. However, the sole legal demand for everybody else is engine condition.

A special arrange was developed. From the input, we've got a line X indicating time. on this line, blocks with tasks were situated receiving the craft, disassembling the

craft, removing paint and additional work moving from look to buy, in different words a sequence of actions.

What is the distinction between reconstruct and overhaul?

The definition of reconstruct within the same definition of the overhaul however except the item of the reconstruct item and rather than simply meeting the service limit or to approved large or small dimension.

What will Associate in Nursing overhaul consist of?

Overhaul typically includes some elements (new elements as necessary to satisfy limits) and (frequently from constant engine). Associate in Nursing overhaul will be done by the manufacturing plant.

3.2 Optimization of the overhaul method

General overhaul of craft is also disbursed in numerous methods as in reference to the idea, thus in reference to the enforced organization and technology. In different word the craft general overhaul will be disbursed in many variants overhaul of components-assemblies, accessories series and industrial overhaul) with larger or smaller variations in individual solutions.

The idea of the civil aviation maintenance in the main depends on the employment of craft, standing of supply support. And should be absolutely harmonious with the applicable aviation operation and maintenance laws. just in case of the military aviation, the case the case totally different.

Dominant role within the maintenance idea, that those activities, has the upkeep policy and organization variety of levels craft style classical, modular, atmosphere conditions the state of supply support.

Regarding the high material worth, complexity, in operation conditions and also the necessary safety in victimization the craft all problems associated with the craft maintenance area unit subject to terribly strict legislation of every country, and within the international transportation to international laws.

This is applicable each to the civil and military aviation.

The additional advanced aviation technology, the larger procurance and air force supply prices. notably high level of resources ought to be allotted for general overhaul of contemporary craft so any saving in such work brings significant resources to the community. This has been the motive to initiate this analysis with the most goal to optimize the overhaul of craft within the arsenal of the military of geographical region.

Once their area unit many variants, the question is to be raised that one to settle on.

The answer isn't easy simple for a minimum of two reasons:

1. Every variant causes bound effects, that is, it affects the standard of the overhauled craft, the prices and also the overhaul craft ground time.
2. Comparison varied variants is performed by various criteria, and it comes all the way down to the multi criteria issue, which might be solved given that limits and needs area unit planned prior to.

General overhaul represents the foremost advanced kind of maintenance, that recovers the craft service life and responsibility throughout the new service life.

The traditional approach to maintenance is predicated on the idea concerning the character and intensity of failures of craft elements (Figure two.4: national physics and area administration, 2000; Pride, 2005; 2006).

In the main the classic overhaul, supported the normal approach on character of failure, is employed for the structure and mechanical systems, and is disbursed to avoid the intensive wear zone.

Such overhaul has been established on the subsequent grounds of variety of craft hours flown, in operation conditions and established failure records on the quantity of craft that function a model for the identification of any essential areas and phenomena wear and deformation and cracks, material correct ties (composition and mechanical proper tires), and style characteristics of specific craft structure elements and testing conditions and performances of larger variety of craft system elements and accessories.

In favor of this is often the information within the space of responsibility, that that the frequency of failure of mechanical part usually obeys the laws of the conventional and to direct wear and tear throughout operation.

Figure 2.5 shows the procedure for resources recovery, craft service life and time between overhaul (TBO), through the overhaul.

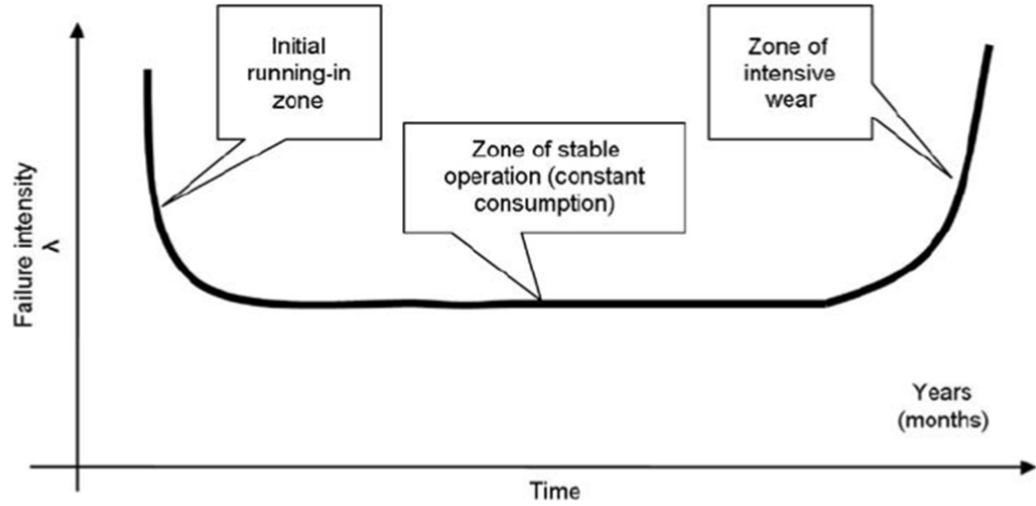


Figure 2.4 Ancient approaches to the character of failure

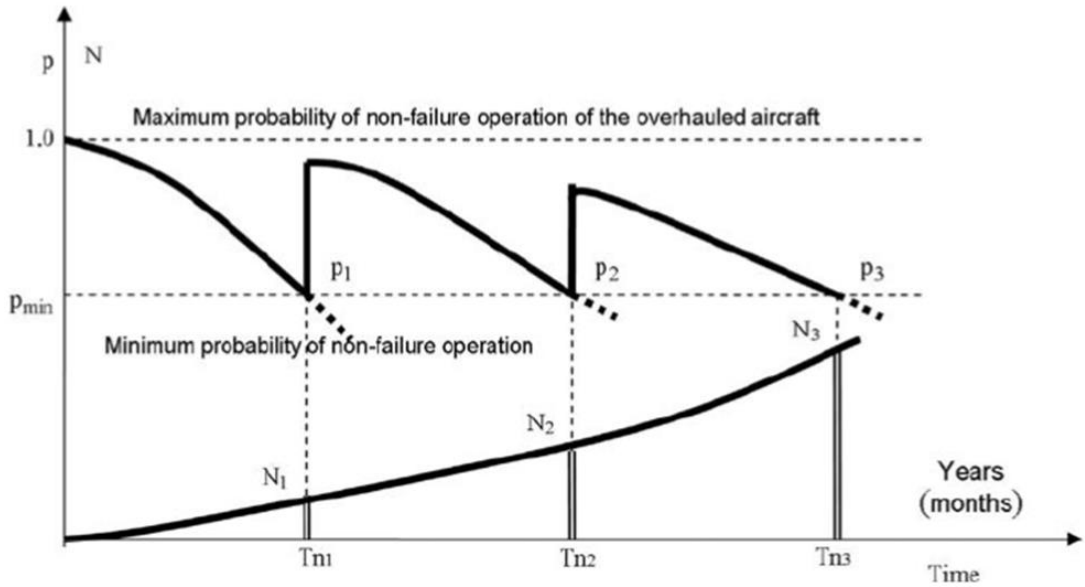


Figure 2.5 Procedure of resources through the overhaul

Overhaul of aeronautics implies a general review of the electrical connections and contacts, repair of computer circuit boards, and replacement of elements that over time cut back they're in the operation characteristics, therefore the operation of the full instrumentality and its responsibility.

This suggests planned replacement of capacitors, resistors, movement wave tubes complete elements essential to craft safety or elements that don't seem to be subject to overhaul.

This determination is predicated on the notion that the bulk of failures defects of electrical, electronic and optoelectronic instrumentality the exponential law of distribution, during which failures area unit freelance of your time, however area unit of the random character. The older, analog instrumentality failures area unit possibly to occur on the sources of power of the realm of power transmission however failures of mechanical elements, like fractures of switches, relay failures, etc. also are frequent.

With digital instrumentality the foremost common issues area unit the code issues.

In most Air Forces dominates the idea of craft maintenance by specified fixed resources.

When expiration of the service life, the craft is shipped to the overhaul manufacturing plant to be overhauled in accordance with the prescribed technology. Such a preventive maintenance procedure comes from a long assessment while not failure of elements, and systems that directly have an effect on the security the security of the order of many many hours or many calendar years.

The term "quality" implies not solely the standard of the overhauled craft however additionally the standard of the overall overhaul method itself. the standard if truth be told represents the measure of the method optimization.

It indicates additionally decrement of increment of the efficiency and profit and long increment of craft overhaul firms.

The idea of the overall overhaul depends on the craft condition and its assemblies, and relying on it it's applied in to:

1. Respect of the craft service life, once a totally Serviceable craft and its assemblies is also overhauled thanks to the terminated "time between overhauls" within the meantime.
2. Respect of the craft service life, once a totally serviceable craft and its assemblies is also overhaul thanks to the terminated (time between overhauls) within the mean whereas.

The word "quality" suggests that not solely the standard of the refurbished craft, however additionally the standard of the melioration method itself. Quality may be a live of method optimization. It additionally points to lower prices, improved potency and profits, and a long increase in craft overhaul firms.

Quality is a measure of process optimization. It also points to lower costs, improved efficiency and profits, and a long-term increase in aircraft overhaul companies.

The general overhaul idea depends on the condition of the craft and its elements and may be applied according to:

- 1) Perform inspections and changes on assemblies or the complete craft, or restore the craft when a breakdown or accident.
- 2) If a completely purposeful craft and its elements area unit possible to be overhauled thanks to "overhaul time" due at constant time, the helpful lifetime of the craft:
 - Minimize maintenance prices.
 - Optimize system responsibility.
 - Minimize maintenance prices whereas maintaining system responsibility at intervals a satisfactory vary.
 - Optimize system responsibility whereas keeping maintenance prices at intervals a satisfactory vary.

Overhauls needs elementary influencers of quality:

- Documentation and knowledge systems.
- Tools, tools and instrumentality.
- Buildings, workshops and warehouses.
- Human Resources. provide system.
- Shipping and Handling. code support.
- Training system.
- Financial cash in hand.

3.3 Time between overhaul

The time between overhaul (TBO) of plane motors is decided throughout the maker's coming up with cycle to ensure Associate in Nursing plane plays out its best even following some serious time activity. an important purpose in time in its reality can decide future execution thus upgrades ought to not be messed with, and neither ought to TBO since it decides precisely once and that elements within the motor ought to be fastened or repaired.

At the purpose once these boundaries area unit followed successfulness is upgraded and also the lifespan of a motor will be delayed.

And it's a time of a amount suggested by makers that Associate in Nursing engine, airframe, or the other part of Associate in Nursing craft will operate beneath average conditions before it ought to be overhauled. Any operation on the far side this era makes all warranties and guarantees invalid and should even be in violation of certification.

What determines Associate in Nursing engine's TBO maintenance?

Typically, TBO ranges between 3,000 to 6,000 flight hours, however many factors should be thought-about – just like the setting of operation, variety of operation, frequency of operation, etc. – so as to properly calculate once is correct for your plane.

Hot and wet regions corrode engines otherwise than areas glorious for dry, cold air. Besides that, it very depends on however onerous you push your craft. Casual aviation craft can have a larger TBO for PT6 engines than everyday work vehicles, thus each plane is exclusive.

Another key issue of TBO is that the soundness of elements. Sometimes, a straightforward fix or replacement will add many hours of flight time. make certain your turboprop bore scope review and hot section review area unit conducted at the prompt times so as to soundly extend your TBO.

If something must be revamped, JSA has the turboprop engine elements that you simply want.

What is the engine throughout TBO?

The TBO of Associate in Nursing engine isn't an whimsical suggestion one will disregard while not running the danger of great consequences. Let JSA assist you manage your engine's TBO we'll keep them few and much between further as facilitate any necessary overhauls to your plane once the time is correct.

Turboprop TBO guarantees inclusion:

Most design connected expenses, for instance, half fix and substitution may be coated by a motor's guarantee – except if the maker's TBO has passed.

The importance of this basic truth to your arranger's life and your disbursal plan cannot be place into words. customary repairs check as suggested by the architects behind the machine are set for successfulness and financial reasons. Leave JSA alone accountable for your turboprop TBO the executives to remain far from any superfluous migraines.

Turboprop TBO guarantees inclusion:

Most design connected expenses, for instance, half fix and substitution may be coated by a motor's guarantee – except if the maker's TBO has passed.

The importance of this basic truth to your arranger's life and your disbursal plan cannot be place into words. customary repairs check as suggested by the architects behind the machine are set for successfulness and financial reasons. Leave JSA alone accountable for your turboprop TBO the executives to remain far from any superfluous migraines.

CONCLUSION TO PART 3

The overhaul process is an overhaul always includes a complete disassembly of the engine, thorough cleaning and inspection of parts, repair of parts as needed and disposal of defective parts.

The service limits are larger and allow for looser fits than manufacture limits. Some shops rebuild engines based on manufacture limits, while others use service limits.

Parts are measured for excessive wear and proper clearances. The allowable dimensions and clearances are given in the manufacturer's overhaul manual in two separate columns; one for manufacture (new) limits and one for service limits.

PART 4. SAFETY CONCERNS AND METHODS FOR OVERHAUL

4.1 Introduction

Apparently perhaps the foremost dangerous occupation on the fireplace ground update is in like manner maybe the foremost un-gainful position. It's untidy, dreary and unsafe, performed later all the intensity of the firefight is completed. And nonetheless it's major to our obvious experience and reasonability on the fireplace ground.

As way back as 1940, Chief actor commoner perceived overhaul collectively of the 5 elementary procedures of firefighting, close rescue, transparency security, management and extinguishment ("Fundamentals of Firefighting ways," NFPA conveyances, 1940).

That's harder than one may expect, yet, on the grounds that update tasks ought to be adjusted against the fireplace examiner's desire to own AN undisturbed region to explore, even as the necessity to watch water to forestall more property hurt.

Regular America depend upon us to utterly smother a blast and befittingly survey whether or not the development is livable once a hearth. Revived flames show absence of exhaustiveness and end with the gig and may become outrageous liabilities for a neighborhood cluster of fire-fighters. the target of every hearth official need to be zero revives, paying very little heed to the type of fireplace.

During this article, I am going to address some of the well-being contemplations to recollect whereas performing arts update, even as bound techniques to ensure you may not be gotten back to for a revive.

4.2 Safety Concerns

Additionally, firefighters have used in depth energy battling the fireplace and a doubtlessly exhausted, that more expands the prospect of injury.

Boost this the uneasiness of wetting wet and filthy turnouts, protection materials from force roofs tumbling down your back, yearning, thirst and temperature limits it seems as if it's in each case either to a fault hot or to a fault cold and plan turns into a hopeless task.

It's very little marvel anyone appreciates being given the task of change the fireplace. This more accentuates the importance of turning new groups to the fireplace ground and fixing an appointed recovery region from the start within the incidence.

As antecedently mentioned, overhaul is AN inherently dangerous operation. a number of the risks include:

The space is usually packed with firemen utilizing hand or power devices in distance to 1 another.

Exposed gas and electrical if not separated will coming back to electrical shock and unstable perils. hearth officers allotted to within tasks ought to affirm with the incidence leader that utilities are sliced to protect laborers from injury as well as rock oil gas and contact.

Visibility is diminished by leftover smoke, clouded windows and absence of lighting within the look additionally the additional restricted deceivability whereas sporting.

The climate is frequently as toxic if no more than throughout the dynamic intense periods of the fireplace.

Stairways will become compromised presenting fall perils to those mounting or down them.

Structural people floor joists, roofs, dividers and rooftops will are compromise requiring firemen consistent carefulness.

As a result of plan tasks do not embrace crucial hearth, firemen will become self-satisfied, defeated their watchmen and during this method become casualties.

Tip of success

If we have a tendency to license customary folks back in their homes later a hearth has occurred, we must always guarantee they will not become setbacks of a revived hearth. Expansive overhaul is irreplaceable, as lives and property are being stated within the event that we have a tendency to disregard to suitably cowl the fireplace. We have a tendency to could have close to nothing, expecting to be any, influence on however a hearth initially starts, nonetheless we've full management over the fire's ability to revive.

Ensuring the presence of adequate amounts of properly operating smoke alerts and screens is furthermore a crucial variable in final whether or not customary folks will resolve the house. In specific cases (like high-wind events, thickly stacked stock or swish existence hazard areas),

You may have to be compelled to introduce a hearth a fireplace a hearth watches on keep disaster from a revived fire.

Because of these inborn risks, it's basic that ICs and friend's officers strictly management the upgrade activity. ways to contemplate include:

Assign firemen to workspaces sufficiently immense to firmly swing tomahawks or alternative hand devices or work power gear. shut management and coordination by officers is an unquestionable demand whereas change in restricted living arrangements wherever a minimum of 2 firemen are cooperating.

Monitor the air at no matter purpose people are within the look, but recall that few out of each odd hearth gas gift are recognized. As we have a tendency to as a full educated in our trial year at work, the plan stage will be the foremost unsafe to our metabolic process frameworks, as unburned results of ignition seethe and float through the atmosphere.

If agitated things ought to be tossed from higher floor windows, the official to blame for upgrade activities ought to demand authorization from the IC or Division Officer.

Entirely once AN analysis of the solicitation (and any elective arrangements are thought of) by the ISO ought to this solicitation be conceded. Assign a daily existence peril zone beneath the window and confine admittance to the area wherever falling trash can strike. Cautious coordination between the within hearth official and therefore the ISO can guarantee a protected climate.

All firemen ought to wear applicable individual defensive gear (PPE), as well as full primary turnouts.

As a corporation official, you must inflexibly implement this normal since it's a lot of the time unheeded.

4.3 Harmful and dangerous production factors for craft technician per the quality ГОСТ 12.0.003-74CCTБ: Currently, engineering is wide utilized in all areas of activity, therefore it's vital to grasp the damaging and harmful factors to that someone is exposed throughout work:

Close to the start of the development it's important to spread all of maybe venturesome and risky creation factors, which may have a spot in movement, storing, mounting, annihilating, transport and testing of the device on plane or in analysis focus of the Plane Maintenance Base (AMB).

It's important to mend on factors from the summary, that normal for object those exercises at its explicit action and to spread the states of their clear verification throughout execution of what reasonably works they seem.

Throughout the specialized administrations of the heavier-than-air craft AE&E the attendant risky unsafe creation components will influence the laborers:

- Portable unprotected AE&E components; spinning switches foothold and surges of the electrical gadgets, that utilized in heavier-than-air craft and motor activity management framework and rotating impellers and air-cooling ventilators of the AE&E, filtering receiving wires of the measuring device stations.
- Portable and collapsing covers and boards of distributive gadgets, distributive boxes and alternative AE&E hardware and moreover versatile boards of the circuit breakers instrument boards.
- Portable items of framework a hold out by fixative supporting hand weights and extraordinary locks: insulator cowls of the measuring device aerials.
- Doppler meters, radio altimeters and radio compasses, fronts of specialized compartments lids and electrical gadgets seats and electrical engines and hearth swell.

- Sharp gear spines and finishes of well-being wires at AE&E total destroying.
- Falling product, instruments and materials at work on tallness throughout specialized help of high organized AE&E totals and equipment, therein range with utilization of automatic lifts.
- Synthetic substances - harmful, grumpy, sharpening, cancer-causing, agent (that impact on human fertile capacity), that are contained geared or utilized at AE&E specialized help: liquor, colophony, pastes, stains, paints, solvents, venomous synthetics at freedom and laundry of the framework and AE&E later compound works, and that they enter profound into a creature through metabolic process mechanical assembly, gi parcel, skin spreads and mucose tunics.

Workplaces that need conditions declared below discuss with the workplaces of high risk:

Throughout technical maintenance of the craft and aerodrome power installations to such conditions are related: craft service conditions on open lot, wherever air temperature is more than $+35^{\circ}\text{C}$ departments of grinding of craft generators brushes, laboratories on repair of electrical instruments and craft radio instrumentation:

- Possibility of coincident human bit to metal constructions and buildings and technological vehicles mechanisms and alternative objects that are connected with earth on one hand, and to gold-bearing bodies of power installations.
- Current conducting floors - gold-bearing, earthen, concrete, brick.
- High temperature (workplaces, within that thanks to the impact of various thermal radiation a temperature exceeds for good or sporadically (longer than for one day) $+350\text{C}$, a referred to as hot).

In activity safety of Harmful and dangerous production factors for craft technician is per 3 totally different normal of ГOCT twelve.0.003-74:1:

1. Psychophysiological.

2. Physical.

3. Chemical.

Psychophysiological:

Psychophysiological is split in to two kind medical specialty overload and physical overload.

Neuropsychiatric overload:

- Emotional overload.
- Analyses overvoltage.
- Monotony of labor.

Physical overload:

- Dynamic.
- Static.

Physical:

- Need or nonattendance of traditional lightweight.
- Expanded or diminished air temperature of the functioning region.
- Sharp edges, burrs and harshness on the surfaces of labor items, apparatuses and hardware.
- Moving machines and instruments; moving pieces of creation hardware and moving things.
- Lacking lighting of the functioning region.
- Area of the operating atmosphere at a crucial stature comparative with the bottom.
- Expanded voltage within the electric circuit of the short out of which may happen through the build.
- Expanded or diminished temperature of surfaces of drugs and materials.
- Expanded degree of based mostly electricity.
- The enlarged dustiness and gassiness of quality of a functioning zone.

- Expanded commotion within the operation atmosphere.
- Expanded vibration level.

Chemical:

- Annoying.
- By penetration into the human body through skin and mucose membranes.
- Toxic.

4.4 Measures to cut back the impact of harmful and dangerous production factors.

GOST 12.0.003-2015 activity safety standards system.

Dangerous and harmful operating factors. Classification.

Word connected Safety and Health - a framework for safeguarding the life and well-being of laborers throughout the time spent operating, as well as legitimate, financial, stratified and specialized, sterile and clean, treatment and prophylactic, recovery and totally different measures.

Throughout the time spent work, a working person is compact by totally different negative variables of the operating climate and therefore the work interaction.

Operating conditions - a bunch of components of the work area and therefore the work cycle that influence the exhibition and strength of a private.

Safe operating conditions - operating conditions beneath that the impact on laborers of unsafe or probably risky creation factors is prohibited or the degree of their impact do not surpass the got wind of principles.

The rationale for work insurance - to limit the likelihood of injury or illness of operating employees at the most extreme work quality.

A private is bestowed to risks in his work exercises. This movement happens in an exceedingly area referred to as the work.

By the sort of impact on the representative, components of the work area are partitioned off into risky and damaging creation factors.

Precarious creation issue- is termed such a creation factor, the impact of that on the employee will prompt injury. OPF incorporates a good vary of energy sway (dynamic,

potential, electrical, warm, substance, so forth) Wellsprings of look of such factors, specifically, moving machines, essentially moving stock, moving items of creation gear, totally different lifting vehicles, current, flying particles of the handled material, warm and effulgent things additionally areas, dynamic harmful and forceful artificial compounds.

Hurtful creation issue- such a creation factor, the impact of that on the employee will prompt his sickness or diminished inability. Sicknesses rising tormented by damaging creation factors are referred to as word connected.

Word connected diseases are partitioned off into: intense word connected sicknesses that have emerged later a solitary (inside one thing like one work shift) openness to hurtful word connected variables; in progress word connected sicknesses that have emerged later rehased openness to unsafe creation factors (expanded centralization of damaging substances within the conduct of the functioning region, enlarged commotion, vibration).

HFFs incorporate enlarged commotion and vibration levels, enlarged or diminished air temperature of the functioning region, dustiness and gas tainting of the air within the functioning region.

Safety - the condition of operating conditions, whereby the impact on operating OPF additionally HMF is rejected.

Modern medical aid - this is often the association of a rendezvous of measures and specialized suggests that, bar or decreasing the result on the operating Hurtful Creation Factors (HPF).

Security planning - association of a rendezvous of measures and specialized suggests that to forestall openness to operating (OPF).

Unsafe operating conditions area unit operating conditions delineate by the presence of unsafe creation factors that surpass clean norms and have an unfavorable impact on the body of the specialist furthermore as his posterity.

The result of risky and hurtful creation factors on a personal will be debilitated or killed by the normal association of labor environments, improvement of mechanical cycles, the use of cluster or doubtless individual defensive gear, and so on.

Insurance against hurtful and dangerous creation factors is warranted by drop-off their level at the supply and utilizing preventive and defensive measures.

At the same time, the flexibility of people within the field of recent perils and techniques for insurance from them is a very important condition for guaranteeing their successfulness.

The greatest permissible value of the unsafe creation issue – this is often the limiting value of the extent of a hurtful creation issue, the impact of that, with AN everyday controlled term at some stage in the total length of administration, doesn't prompt a discount in operating limit and ill each throughout the time of labor movement and to a health problem within the succeeding time of life, and moreover does not have an unfavorable impact on successfulness posterity.

Factors adding to figure security. There are a unit a number of totally different measures, the execution of which is able to guarantee safe operating conditions:

1. Stratified, comprising within the lead of AN objective work method within the course of labor security problems. It oft happens that the highest of AN venture cannot cowl all paces of his management. Hence, for prime quality and ideal work to ensure the protected existence of laborers, the chief will use a trained skilled, and moreover disperse liabilities between the first-rate of the workplace.

2. Set up exercises are: within the right set up of structures and styles of the endeavor. within the capable lead of configuration add regards to the handled unrefined parts and also the completed item or things.

3. Innovative, the importance of that lies within the objective accumulation and satisfaction of the wants of the principal creation archive of the endeavor - innovative tips.

4. Useful infer right, as per the rules, activity: parts, instrumentation Vehicle.

5. The embodiment of fresh and sterile measures is to grant laborers: Individual defensive gear, gadgets, footwear and overalls. an area for warming and uptake. A public lavatory and if essential, a shower.

4.5 Responsibilities of the operator before beginning the elevate operation

1. The driver is obliged, together with the slinger, to check the serviceability of the removable lifting devices and the presence of stamps or tags on them indicating the carrying capacity, test date and number.

2. Inspection of the lift should be carried out only when the mechanisms are inoperative, when the voltage is disconnected or when the hydraulic system is off. When accepting a working lift, its inspection must be carried out in conjunction with the driver who hands over the shift. To inspect the lift, the administration of an enterprise, organization or workshop must allocate the necessary time at the beginning of the shift.

3. When inspecting the lift, the driver must use a portable lamp with a voltage of no more than 42 V.

4. Before starting work, the driver is obliged to make sure that all mechanisms, metal structures, devices and safety devices and other parts of the lift are faulty. We need that drive must:

- Truly watching the presence and quality of security gadgets and gadgets on: as way as attainable switches, limit load electrical circuit, obstructing frameworks, elevate slant purpose pointer, crisis transferal down arrangement of the support, sound sign.

- Review the snare, whenever given by the set up, and its affixing within the enclosure.

- Truly watching the oil of pinion wheels, heading and ropes, even as the presence of ointments, oil seals and liquid within the water driven framework.

- Review the state of the ropes and their attaching on the drum and blast even as their contact the drum and squares at the helper load lifting part assumptive that such an instrument is given on the Crane.

- Checking the quality of the water high-powered drive of the elevate, adaptable hoses, siphons and security valves on the strain lines.

- Review the systems and brakes of the elevate, their affixing, even as the framing.

- Truly watching the oil of pinion wheels, heading and ropes, even as the presence of ointments, oil seals and liquid within the water driven framework.

- Truly taking a glance at the workableness of the electrical elevate visual assessment while not eliminating the covers and activity and electrical gadgets switch, starting resistors, limit switches even as investigate the slip rings or gatherers of electrical engines and their brushes. On the off probability that the elevate is controlled by an out of doors network, the driving force ought to truly check out the quality of the adaptable link.

- Extremely taking a glance at the presence and practicality of the penned areas of the parts and also the support.

5. Installation of a hoist at the sting of the slope of a pit or trench (with the exception of the slopes of railway tracks) is allowed solely with the permission of the administration, subject to the distances from the bottom of the slope to the closest support provided for by the foundations. If it's not possible to take care of these distances, the slope should be strong.

6. Before beginning work, the driving force should check the provision of certificates for the correct to figure from the employees of the cradle and slingers, if the employees begin work for the primary time.

7. The driving force is duty-bound to put in the elevate on supports altogether cases; at a similar time, he should make sure that the supports area unit in smart order which sturdy and stable linings area unit placed underneath them. during this case, railway lifts should be bolstered with all rail clamps. The pads area unit an adjunct to the elevate and should air it.

8. It's prohibited to use the elevate that has not undergone maintenance and has defects. The administration of the enterprise has no right to want the driving force to start out acting on AN uncurbed and faulty elevate.

9. Once inspecting the elevate, the driving force should use a transportable lamp with a voltage of no over 42 V.

When inspecting the elevate before putt it into operation the driving force, having created positive that the specified dimensions of the approach area unit determined, should check all the mechanisms at idle speed and check the correctness of the operation:

- Breaks
- Lift mechanisms.

- Hydro and electrical system.
- Safety devices.

10. The installation of the elevator for construction and installation work ought to be disbursement in accordance with the work production project, that ought to offer for:

- The conditions for the installation and operation of lifts close to the slopes of excavations or trenches.
- Compliance of the put in lifts with the conditions of construction and installation or repair add terms of carrying capability, lifting height and reach.
- Measures for the safe performance of labor on the location wherever the elevator is put in fencing of the development, assembly sites or repair space.
- Guaranteeing a secure distance from power lines, places of movement of conveyance and pedestrians, furthermore as safe distances for the approach of lifts to buildings and places of storage of building structures and materials.

CONCLUSION TO PART 4

During this article, I studied the address a little of the successfulness contemplations to recollect whereas activity update, even as bound techniques to ensure you may not be gotten back to for a revive.

Apparently perhaps the foremost dangerous occupation on the hearth ground update is in like manner maybe the foremost un-gainful position. It's untidy, dreary and unsafe, performed later all the intensity of the firefight is finished. And nevertheless, it's major to our obvious experience and reasonability on the hearth ground.

As way back as 1940, Chief actor common person perceived overhaul joined of the 5 basic procedures of firefighting, obtainable rescue, transparency security, management and extinguishment ("Fundamentals of Firefighting techniques," NFPA conveyances, 1940).

PART 5. AVIATION AND THE THEREFORE THE SURROUNDINGS

5.1 Introduction

Environmental Protection is one amongst ICAO's 5 strategic objectives. once United Nations agency initial began engaged on environmental Protection within the late Nineteen Sixties, the main focus was on the institution of international policies and Standards and counseled Practices associated with craft noise.

Several aspects of United Nations agency's environmental work square measure conducted in cooperation with the ICAO Committee on Aviation Environmental Protection (CAEP), that consists of Members and Observers from States, intergovernmental and non-governmental organizations representing aviation trade and environmental interests.

Elements of this basket of measures, together with environmental trends, square measure conferred during this chapter. more details on the agreement by the thirty ninth Session of the United Nations agency.

Assembly on a worldwide market-based live (MBM) theme for international aviation, brought up because the Carbon compensative and Reduction theme for International Aviation (CORSIA), collectively a part of the basket of measures.

Each three-year work cycle, the International Civil Aviation

Organization (ICAO) Committee on Aviation Environmental.

Protection (CAEP) develops associate degree analysis of environmental.

Trends in aviation to include:

- Craft Emissions that have an effect on the world Climate.
- Craft Noise.
- Craft Emissions that have an effect on native Local Air Quality (LAQ).

5.2 Environmental trends in aviation to a pair of 2050

The appraisal of GHG patterns depends on the foremost recent CAEP focal interest conjecture utilizing a base year of 2010; the legitimacy of that was evaluated within the CAEP/10 (2016) cycle. calculable years enclosed 2020 associate degreed 2030 with a growth to 2040 and results figure to 2050. data introduced for 2005 and 2006 square measure perennial from earlier patterns appraisals.

The patterns introduced were created with regards to an additional extended term read. momentaneous changes in worldwide eco-friendliness will be compact significantly by a good scope of variables, as an example, vacillations in fuel prices, and worldwide monetary conditions.

Figure 5.1 offers results to worldwide full-flight fuel consumes for international astronautics from 2005 to 2040, and after figure to 2050.

The fuel consume investigation considers the commitment of aero-plane innovation, more developed traffic the board, and foundation utilize practical upgrades to decrease fuel utilization. The figure likewise represents the fuel consume that will be traditional forward ICAO's (2%) yearly eco-friendliness optimistic objective were accomplished.

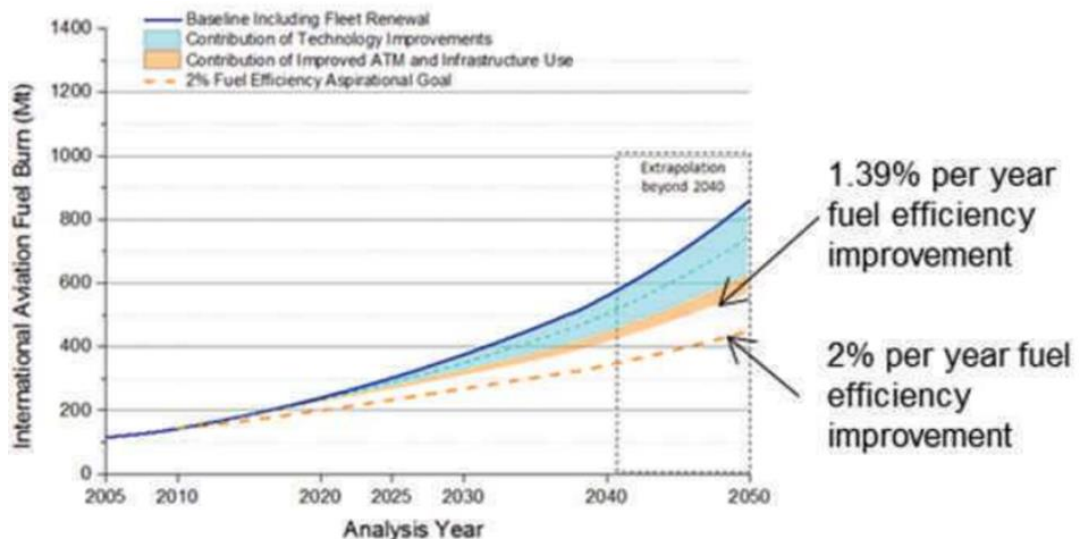


Figure 5.1 Fuel Burn Trends from International Aviation 2005 to 2050

Figure 2 presents full-flight discharges for international astronautics from 2005 to 2040, and after figure to 2050.

This figure simply considers the discharges connected with the ignition of stream fuel, acceptive that 1 weight unit of fly fuel derived creates 3.16 weight unit of. equally like the fuel consume examination, this investigation considers the commitment of aero-plane innovation, more developed traffic the board and framework utilize practical upgrades.

What is additional, the scope of conceivable outflows in 2020 square measure shown for respect to the worldwide optimistic objective of keeping net at this level.

Albeit not showed during a totally different figure the interest vulnerability impact on the fuel consume estimations displayed in Figure a pair of identically affects the results.

In lightweight of the best expected fuel utilization in 2020 and therefore the expected state of affairs nine fuel utilization in 2040 a base discharge hole of 523 Mt is projected in 2040. Extrapolating state of affairs nine to 2050 outcomes during a 1,039 Mt hole.

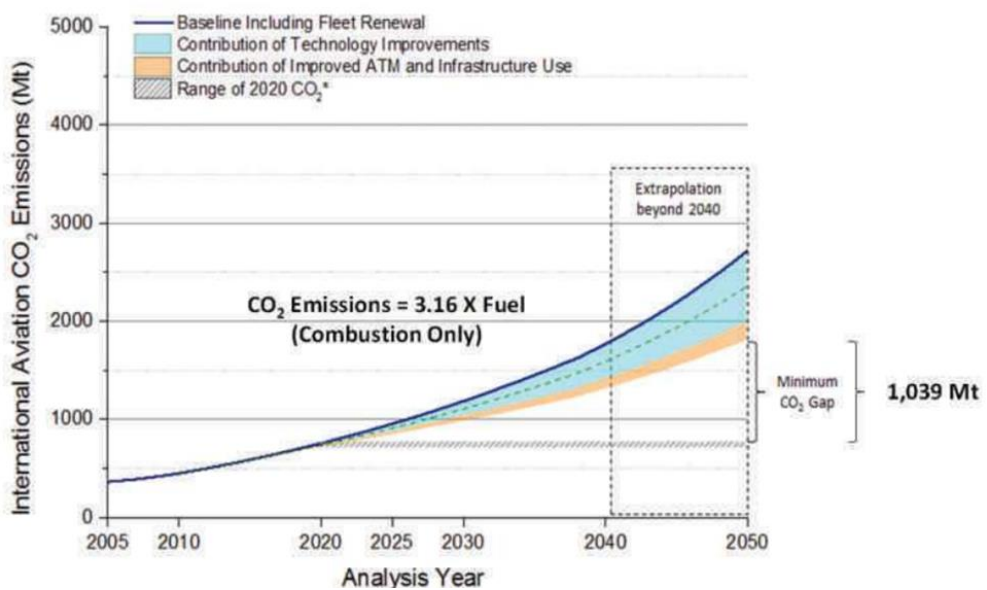


Figure 5.2 Emissions trends from International Aviation from 2005 to 2050.

Figure 3 puts these contributions in context with the uncertainty related to the forecasted demand, that is notably larger than the vary of potential contributions from technological and operational enhancements.

Despite this uncertainty, the baseline trends forecast is broadly speaking in line with alternative revealed aviation forecasts.

The trends forecast, that is for Revenue Ton Kilometers (RTK) and international aviation, shows a 20-year (2010-2030) Compound Average Annual Rate (CAGR) of 5.3 per cent. By means of comparison victimization for Revenue rider Kilometers (RPK) for all traffic because the forecast measuring, Boeing's, Airbus' and Embraer's most 2015 forecasts have 20 years from 2014 to 2034 CAGRs of 4.9 per cent, 4.6 per cent and 4.9 per cent severally.

The CAEP's RPK twenty-year forecast (2010-2030) contains a baseline forecast of 4.9 per cent, with an occasional outlook at 4.2 % and high at 5.7%.

Whereas acknowledging the various forecast units and coverage, the trends baseline outlook shows cheap alignment with the aviation trade and therefore the recent CAEP read of future aviation growth within the early 2010s.

The results conferred in Figures 1 and a couple of square measure for international aviation solely. In 2010, more or less 65 per cent of world aviation fuel consumption was from international aviation.

Supported CAEP/MDG's analysis, his proportion is predicted to grow to just about 70% by 2050.

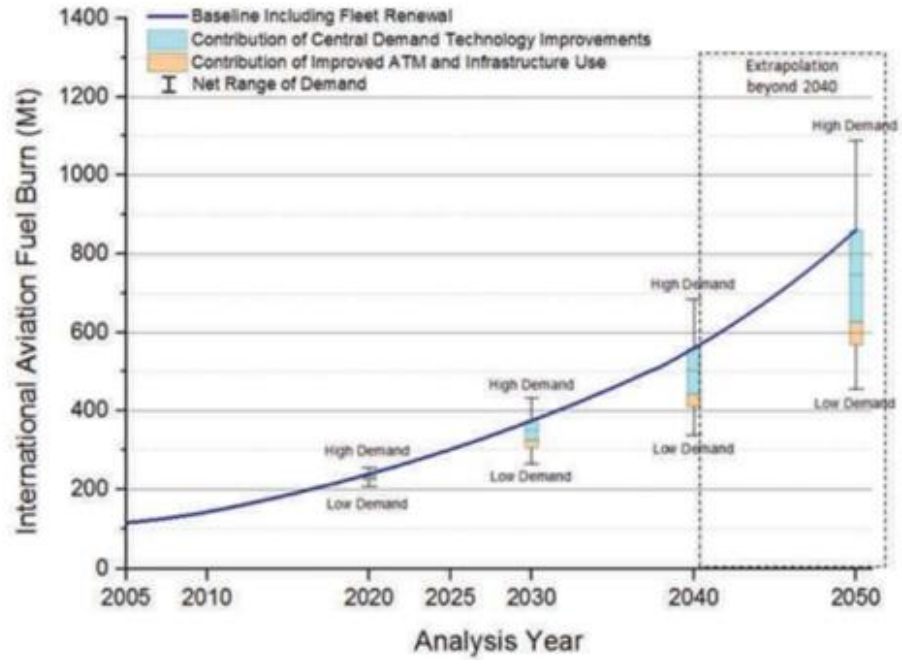


Figure 5.3 vary of Uncertainties related to Demand Forecast from 2005 to 2050.

5.3 Contribution of other Fuels to Trends Assessment:

CAEP was charged with calculative estimates of other Jet Fuel (AJF) contributions to fuel replacement and life cycle

GHG emissions reductions within the Trends Assessment dead set 2050. Analyses were performed for 2020 and 2050. The short eventualities for AJF accessibility were established from fuel producers' announcements concerning their production plans from state-sponsored production plans, if related to United Nations agency Member State target.

For the semipermanent eventualities, CAEP assessed future jet fuel accessibility by initial estimating the first bioenergy potential forced by hand-picked environmental and socio-economic factors; by second estimating the proportion of bioenergy potential that might truly be achieved or made; and at the last by exploring the number of AJF that might be produced from the accessible bioenergy.

AJF accessibility was calculated together with nine totally different teams of possible feed stocks (starchy crops; honied crops; lignocellulose crops; oily crops; agricultural residues; biological science residues; waste fats, oils and greases; microalgae; municipal solid waste (MSW). the ultimate prices provided by CAEP to MDG embrace potential total international production and a median Life Cycle Assessment (LCA) value supported the share of various fuel sorts that contribute to every state of affairs.

The LCA esteems aren't planned to be applied severally to provincial gauges.

The patterns appraisal figures for worldwide flying displayed at a lower place incorporate the scope of CAEP results associate degreed an illustrative state of affairs that accomplishes 90 discharges decrease acceptive large strategy impetuses and high biomass accessibility. Fuel trade results for worldwide flying will be found in Figure 5.4 and figure 5.5 for internet results.

What proportion AJF and therefore the and therefore the outflows decreases were selected comparatively among international and native utilize obsessed on projected fuel request 65 and 35 you bored with 2010 severally.

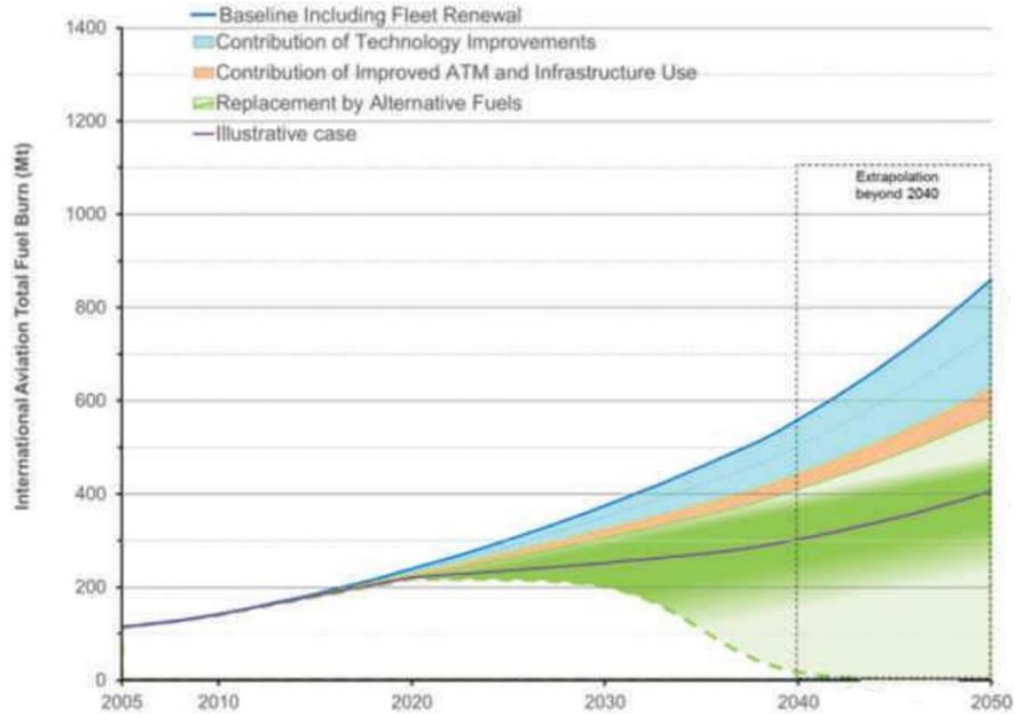


Figure 5.4 Craft Fuel Burn from International Aviation.

2005 to 2050 Updated to incorporate Potential Replacement of Jet Fuel with various Fuels.

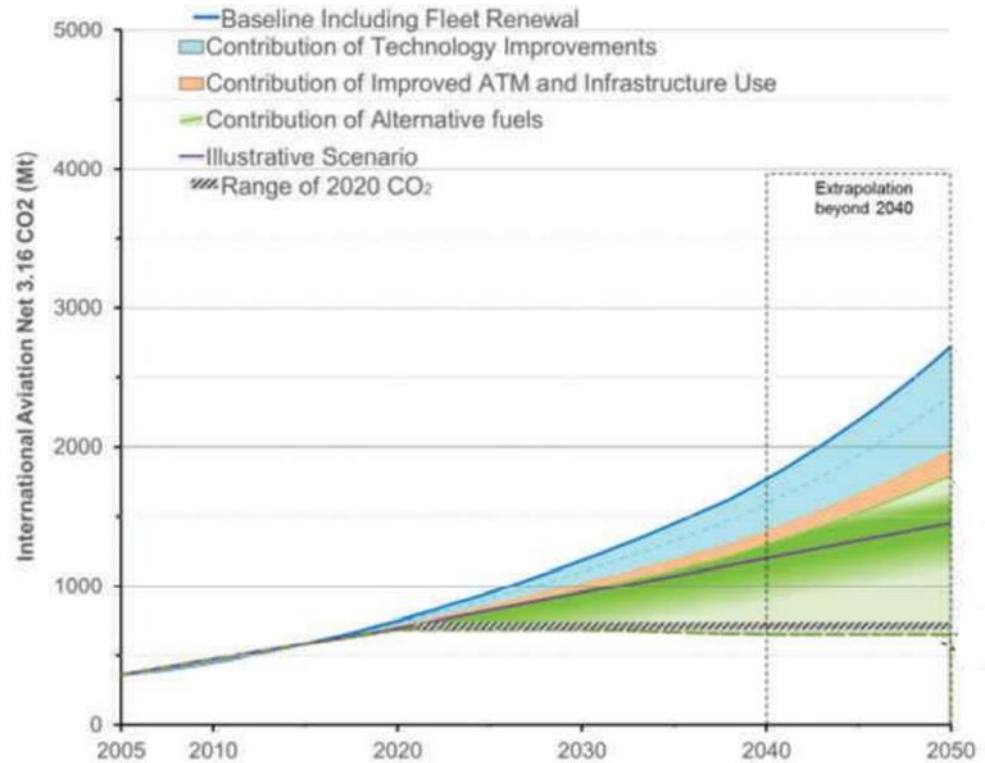


Figure 5.5 Craft Emissions from International Aviation from 2005 to 2050

Updated to incorporate various Fuels Life Cycle emissions Reductions.

Table 5.1 Full flight fuel Burn and Scenarios:

Serial no.	Name	Technology Improvement	Operational Improvement
1	Baseline together with Fleet Renewal	None	None
2	Low craft Technology and Moderate Operational Improvement	0.96% / yr. 2010 – 2050 0.57% / yr. 2015 - 2050	CAP/8 Freelance Improvement Bound
3	Moderate Craft Technology and	0.96% / yr. 2010 - 2050	CAP/8

	Operational Improvement		Freelance Improvement Boundary
4	Advanced Craft Technology and Operational Improvement	1.16 % / yr. 2010 - 2050	CAP/8 Freelance Improvement Boundary
5	Optimistic Craft Technology and Advanced Operational Improvement	1.50% / yr. 2010 - 2050	CAP/8 Freelance Improvement Boundary
6	Low Craft Technology and CAE/9 Freelance Skilled Operational Improvement	0.96% / yr. 2010 – 2050 0.57% / yr. 2015 – 2050	CAP/8 Independent Improvement
7	Moderate Craft Technology and CAP/9 i.e., Operational	0.96% / yr. 2010 – 2050	CAP/8 Independent Improvement
8	Advance Craft Technology and CAP/9 i.e., Operational Improvement	1.16% / yr. 2010 - 2050	CAP/8 Independent Improvement
9	Optimistic Aircraft Technology	1.50% / yr. 2010 - 2050	CAP/8 Independent Improvement

	and CAP/9 IE Operational Improvement		
--	--	--	--

Observe:

Freelance skilled is depicted as i.e. In CAEP/8 2010 IEs provided a variety of operational enhancements within the kind of a bound and boundary.

Table 5.2 Eventualities Developed for the Assessment of Craft Noise Trends:

Serial no.	Name	Technology Improvement	Operation Improvement
1	Sensitivity case	None	None
2	Low Craft Technology and Moderate Operational Improvement	0.3 EPNdB / yr. 2011 – 2013 0.1 EPNdB /	2 % Reduction on top of things space from applied to population exposed
3	Moderate Craft Technology and Operational Improvement	0.2 yr. 2014-2040 0.3 EPNdB / yr. 2011 - 2030	Moderate Craft Technology and Operational Improvement
4	Advance Craft Technology and Moderate Operational Improvement	0.3 EPNdB / yr. 2011 - 2040	2 % reduction on top of things from applied to population exposed.

Observe:

EPNdB: Effective Perceived Amplitude in Decibels.

Table 5.3 Eventualities Developed for the Assessment of Craft LAQ Trends:

Serial no.	Name	Technology Improvement	Operational Improvement
1	Sensitivity Case	None	None
2	Moderate Craft Technology and Operational Improvement	50% CAEP/7 Night freelance skilled goals for 2030 nothing	CAEP/9 i.e.,
3	Advance Craft Technology and Operational Improvement	100% CAEP/7 Night freelance skilled goals for 2030 nothing thereafter	CAEP/9 i.e.,

Observe.

Serial 1:

Is that the sensitivity case that assumes the operational enhancements necessary to keep up current operational potency levels, however doesn't embrace any craft technology enhancements on the far side those accessible in 2010 production craft.

Serial 2 and 3:

Assume craft Night enhancements primarily based upon achieving 50% to 100% severally of the reduction from this Night emission levels to the Night emissions levels by CAEP/7 (2007) Night freelance skilled goals review regarding hr. of this CAEP/6 (2004) Night normal for 2030, similarly as fleet-wide operational enhancements by region.

Figure 5.6 provides results for Night emissions below 3,000 feet AGL from international operations for 2010, 2020, 2030, and 2040. The 2010 baseline price is regarding 0.15 million metric tons (Mt, 1kg x 10⁹).

In 2040, total Night ranges from 0.32 Mt, with state of affairs 3 to 0.42 Mt with Serial 2.

The results for PM emissions from international operations below 3,000 feet AGL follow constant trends as those for Night.

The 2010 baseline PM price is 914 metric tons. In 2040, total international PM is projected to be regarding 3,003 metric tons with Serial a pair of.

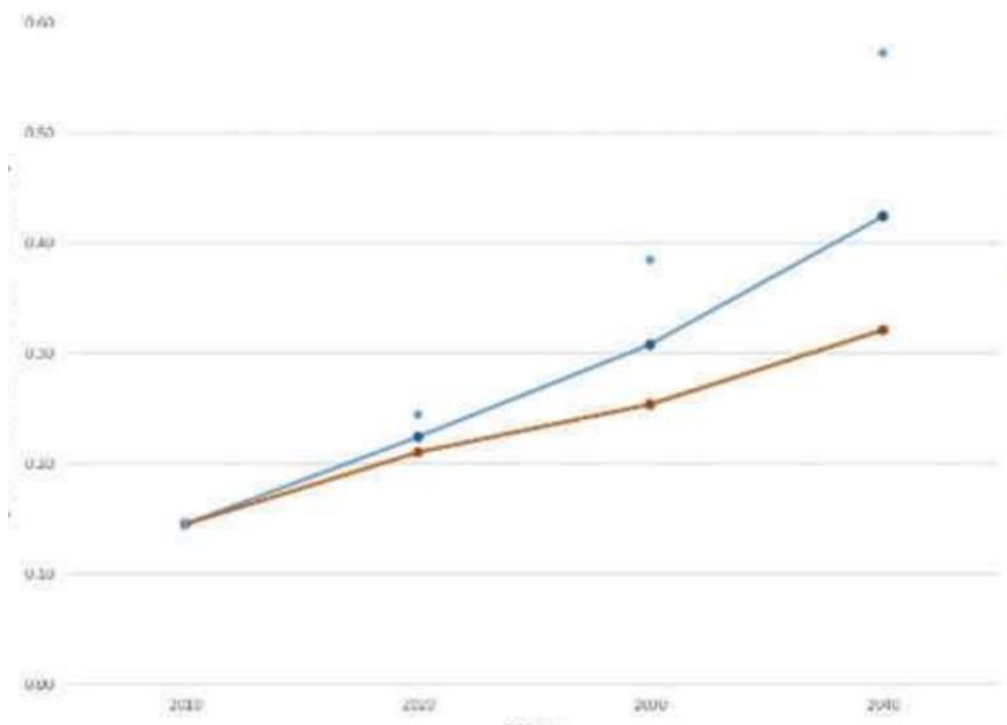


Figure 5.6 Total International Craft night below 3000 Feet

CONCLUSION TO PART 5

Several aspects of United Nations agency's environmental work square measure conducted in cooperation with the ICAO Committee on Aviation Environmental Protection (CAEP), that consists of Members and Observers from States, intergovernmental and non-governmental organizations representing aviation trade and environmental interests.

Environmental Protection is one amongst ICAO's 5 strategic objectives. once United Nations agency initial began engaged on environmental Protection within the late Nineteen Sixties, the main focus was on the institution of international policies and Standards and counseled Practices associated with craft noise.

Elements of this basket of measures, together with environmental trends, square measure conferred during this chapter. more details on the agreement by the thirty ninth Session of the United Nations agency.

PART 6. LABOR PROTECTION

Work assurance is arrangement of the legitimate, social and financial, stratified and specialized, sterile and clean and treatment-and-prophylactic activities and assets assigned for saving life, eudaemonia and dealing capability of the individual over the span of labor action.

Generally, entirely when mishaps and assessments and acquire Prescriptions for finish of the imperfections of heads of ventures are occupied with improvement of documentation of the endeavor on problems with labor insurance. On the off likelihood that they'd done this antecedently - would have unbroken removed from various problems, together with mishaps. Since throughout the time spent the advancement documentation of is characterized because the request for execution of works, therefore and obligations of chiefs and leaders.

As a matter of initial importance, the business can utilize the professional on work assurance to:

- To minimize the danger of employer's liability.
- Documentation of the enterprise on problems with labor protection in keeping with applicable Laws, rules and rules.
- Regular instructing.

The end result - in several organizations do not have the required documentation of security, conjointly the accessibility of authorization to start (proceeded) execution or activity of high-hazard - rules are primarily unnoted administrators and entertainers.

Anyway, immediate obligation - disciplinary, authoritative, monetary, criminal as indicated by the law - for infringement of that to ensure safe operating states of representatives with heads of ventures no was shooting!

Consequently, heads of undertakings disapprove of investigators for management of labor.

Labor protection management and responsibilities of the employer:

- Managers can build up correct offices and choose officers to work out express work assurance – connected problems, can endorse their appropriate sets of expectations with sign of their work liabilities, freedoms and obligation for inability to play out their work capacities unconditional on them, and can see for such sets of responsibilities be consented to.
- Leader can configuration coordinated activities with cooperation of the gatherings to the combination understanding and can convey such activities into impact to accomplish the presentation/consistence to material principles and to make the present degree of labor insurance.
- Can created for enjoying out the essential preventive measures as per modified conditions.
- Can execute leading innovations, accomplishments of science and innovation, motorized techniques for creation and mechanization of creation, bioengineering wants, best observe parturient assurance.
- Can delineated for legitimate maintenance of structures and styles, creation and cycle hardware, for his or her mechanical condition be determined.
- Can created for disposal of reasons for mishaps, word connected diseases, and for preventive activities be proceeded as trained by analytical commissions supported the discoveries of such cause's examinations.
- Can created for review of labor assurance, workplace examination of operating conditions, analysis of specialized state of recent gear, certificate of labor environments for harmony with legal work insurance tips and rules within the method and by cutoff times created by laws, and supported their discoveries can move to up lengths to eliminate unsafe and unsafe trendy parts.
- Can arrange and endorse rules, directions alternative work assurance tips relevant within the enterprise (hereinafter alluded to because the "in-house tips of the venture") and expressing rules for playing works and rules for conduct of college on the endeavor regions, premises, building destinations, work environments as per laws and

tips administering work insurance, can outfit laborers at no expense with work security tips and rules and with in-house work security tips of the venture.

- Can regulate the college consistence with planning cycles, rules of taking care of plant, instruments, hardware and alternative creation offices, utilization of cluster and individual security implies, execution of works as per legal work assurance stipulations.
- Can created for safe work ways and collaboration with workers within the field of labor security.
- Can move to essential lengths to allow facilitate to individuals endured, can connect with, given that this is often true needed, practiced salvage teams just in case of disappointments and mishaps happening at the enterprise.

Responsibilities employee:

- Subsume individual eudaemonia and eudaemonia, even as the safety and soundness of others throughout the time spent enjoying out any work or whereas anyplace close.
- Apprehend and accept as true with the wants of laws and tips on work eudaemonia, applicable treatment of equipment, hardware, gear and completely different technique for creation, utilization of cluster and individual defensive gear.
- Happen as per the regulation basic and intermittent clinical assessments.

Service of labor protection:

For undertakings with fifty and a lot of distinguished variety of labor force used businesses can build up work insurance division as per the quality tips supported by expressly approved brought along work assurance body power.

For underneath takings with under fifty people from workers used the work insurance capacities could be performed by befittingly ready individuals on a task sharing premise.

For underneath takings with under twenty people from workers used the work insurance capacities could be performed by the outsider contracted consultants with correct capabilities.

Work security workplace can report foursquare to manager.

Standing of labor security supervisors and consultants are going to be raised to it of directors and consultants of primary creation and specialized offices.

Work security trained professionals, assumptive this is often the case needed, are qualified for:

- Issue limiting bearings to the A-one of the enterprise regions to wipe out the present lacks, to induce from them essential information, reports and clarifications on work insurance connected problems.
- Request the individuals, WHO bombed legal clinical assessments, preparing, directions, trial of knowledge and neglected to induce leeway for correct works, neglecting to follow legal work insurance tips and rules, be taken out from work.
- Suspend work of creation offices, shop, plant, machines, components, hardware activity and activity of various technique for creation just in case of infringement and non-compliances representing a danger to life or eudaemonia of workers.
- Forward requests to the representatives for manpower neglecting to accept as true with work assurance stipulations be delivered to obligation.
- The orders gave by work assurance professional could be born by the business because it was.
- Work security workplace could be changed solely just in case of the business enterprise liquidation or within the occasion within the event that a singular boss suspends utilizing the used work.

Documentation on labor protection:

Endeavors can continue with work assurance – connected tips, request archives, saying and records.

Guidelines:

- (Laws, rules, rules, normal tips, signs, structures).
- Request reports:
- (Riders, headings, guidelines, rules).

Revealing:

- Legal insights revealing structure.

Records mirrors all work assurance connected exercises at the endeavor, and it'll include:

- Logbooks, records, plans, minutes, plans, designs.

All documentation needs to be unbroken in care within the enterprise work security division in an exceedingly legitimate method, which is able to guarantee advantageous utilization of same, given that this is often true needed, or it assessment by state body specialists.

Guidelines of labor protection:

Tips have the case with a legal demonstration, that sets up work assurance stipulations to be limiting for college in execution of specific quite works or for employees of a specific occupation, on work places, on trendy premises, on the house of huge business and on building destinations or in several spots, wherever such works, work or occupation obligations ar performed by steering of the man of affairs or by the ability acting in compatibility with the man of affairs directions.

Rules took on by the endeavors are going to be alluded to legal work insurance acts material within the extent of a selected venture. Such rules are going to be planned supported pertinent state meet oral and industry-explicit work assurance tips, normal

rules and planning documentation of the venture subject to express creation conditions and security stipulations expressed in operating and fix manuals of the producers of the gear used by a given endeavor. Such rules are dependent upon endorsement by the business and can be limiting for employees of correct line or for college playing fitting works at a given endeavor.

Testing and coaching on labor protection:

Applicable tips of rules for prepared making ready of ventures workers on work insurance problems are going to be planned and supported by the leader orders and schedule plans for tutorial conferences and knowledge tests on work security problems to be delivered to the data on the college are going to be ready at the endeavors supported the quality tips and with regular payment for points of interest of creation and stipulations of industry-explicit legal tips on work assurance.

College of ventures once conceded to figure and intermittently from that time in course of their work, and understudies, learners and understudies throughout instructing and instructive cycle ought to pass with flying colors making ready and knowledge assessment as per stipulations of the quality tips. they'll not be conceded a freedom for work (or concerned making ready tasks) except if they pass with flying colors making ready and knowledge assessments on work assurance.

Data check on work assurance are going to be directed as assessment taken on assessment inquiries by oral meeting or by computer helped self-testing survey with succeeding oral meeting. Aftereffects of college data tests are going to be mirrored within the fitting minutes.

Fitting endorsements are going to be given to the individuals, WHO showed eatable outcomes in data tests on work insurance.

Heads of ventures and developments (heads of outlets, divisions, analysis facilities, studios, so on) are going to be in command of association, making ready and knowledge testing of labor force on work security, whereas the work assurance workplace are going to be responsible for command over the work insurance.

Registration and investigation of accidents:

Abrupt weaknesses of eudaemonia, wounds, wounds, together with those caused by actual wounds, caused by completely different individuals, intense work connected infections and intense work connected and completely different poisonings, heat strokes, consumes, curing, drowning, electrical shocks, effects of lightning and radiation, completely different harms caused by disappointments, fires, demonstrations of God (quake, landslips, flooding, tropical storms and completely different disasters), contacts with creatures, bugs and completely different delegates of fauna and vegetation that are caused the worker's inadequacy for one operating day or longer or those caused the necessity for the endured individual to maneuver to alternative (with a lot of agreeable work conditions) work for no but one work day, and deadly mishaps at the endeavor (hereinafter alluded to as "mishaps").

Supported the assessment gave by the perceptive commission those mishaps that happened with the manpower over the span of their work execution, together with work excursions, and people happening during:

- Are going to be appeared to be trendy mishaps and also the fitting demonstration are going to be dead in step with from H-1 on such mishaps.
- On the off likelihood that H-1 examine the analytical commission ought not be used for reportage the mishap, then, at that time, HT structure is going to be used for archiving the mishap (non-modern mishap) as per the Procedure for examination and hitch of non-modern mishaps.

Certification of workplaces:

Certificate of labor environments in step with their functioning conditions are going to be directed at ventures and associations notwithstanding their style of consolidation and type of business, wherever planning interaction, hardware used, unrefined parts and provides ar potential wellsprings of unsafe and dangerous creation factors, which can antagonistically influence the eudaemonia of college and their relatives each as of currently and presently.

The very important motivation behind the affirmation is guideline of the affiliation between the man of affairs or its approved body and also the college in acknowledgment of freedoms to sound and safe operating conditions, specific regular payment, benefits and countervailing installments for add antagonistic conditions.

The confirmation is going to be directed as per the Procedure and purposeful rules reminiscent of affirmation of operating environments in step with operating conditions, as supported by the Ministry of Labor and Ministry of Health.

The certificate is going to be directed by confirming commission, and also the people and powers therefrom are going to be supported by the enterprise wide (association wide) request within the amount mounted by the combination understanding nonetheless no less a lot of the time than once like mechanism.

Accreditation of labor environments incorporates:

- Distinctive components and foundations for event of unfriendly operating conditions.
- Clean and-sterile investigation of the weather of recent climate, hardness and force of labor method at a piece environment.
- Coordinated analysis of the weather of recent climate and nature of labor for consistence of their qualities with the principles of occupation prosperity, development and sterile standards and rules.
- Distinctive the extent of mischief and risk of labor and its inclination beneath clean order.
- Validation of the work atmosphere been alluded to the classification with unsafe (and particularly destructive), onerous (especially dedicated conditions.
- Distinctive (affirmation) of the representatives right to special arrangement of advantages for add unfriendly conditions.
- Drafting a summing up of labor environments, creation divisions, exchanges and positions with a special arrangement of advantages.

- Audit of specialized and class-conscious activities performed towards improvement of cleanliness, nature and prosperity of labor levels.

Organizational Structure of Labor Protection:

To arranged the work not extremely settled in Section labor can, considering the number of staff in associate enterprise and therefore the kind of exercises, assign or enlist one or a couple of work assurance trained professionals or build up a class-conscious unit of labor insurance.

The tactic for the getting ready of labor security trained professionals, work assurance co-coordinators, managers, staff and believed agents are settled by the cupboard.

A business can provide the work insurance skilled the necessary suggests that and time within operating hours all at once the person would possibly satisfy their commitments. The assignment of a pieces as a work security skilled might not cause that person ominous outcomes or confine in another manner their right.

If there aren't in way over ten representatives in a trial and therefore the business has been ready as per the strategy controlled by the cupboard, the individual in question could himself or herself satisfy the commitments of a piece assurance subject material skilled.

CONCLUSION TO PART 6

Certificate of labor environments consistent with their functioning conditions are directed at ventures and associations notwithstanding their form of consolidation and kind of business, wherever planning interaction, hardware used, unrefined elements and provides area unit doable wellsprings of unsafe and dangerous creation factors, which can antagonistically influence the prosperity of school and their relatives each as of currently and soon.

Heads of ventures and developments (heads of outlets, divisions, analysis facilities, studios, then on) are accountable for association, getting ready and data testing of labor force on work security, whereas the work assurance workplace are chargeable for command over the work insurance.

PART 7. ENVIRONMENT PROTECTION

The International Civil Aviation Organization ESAF Regional workplace, beneath the direction of the International Civil Aviation Organization Headquarters, offers assistance on aeronautics ecological security to the twenty-four States beneath its umbrella. this is often to figure on the natural exhibition of flight within the Region. The ESAF Region's ecological wants vary from facilitate with knowledge on property Aviation Fuels (SAF), Carbon compensative and Reduction theme for International Aviation (CORSIA) execution.

Improvement of State Action Plans and facilitate with the inspiration of chum Partnerships on State Action Plans, CORSIA and SAFs. this is often finished totally dead set accomplishing the 3 vital ecological objectives:

- To limit or reduce the number of people wedged by vital plane commotion.
- To limit or reduce the result of natural philosophy emanations on neighborhood air quality.
- To limit or reduce the result of natural philosophy gas harming substance outflows on the worldwide atmosphere.

The Committee on Aviation Environmental Protection (CAEP) upholds the International Civil Aviation Organization Council in description new ways and taking over new Standards and suggested Practices (SARP) known with clamor, neighborhood air quality (LAQ) and therefore the crate of measures for decreasing international flight CO₂ outflows, as well as plane innovation, useful improvement, sufferable aeronautics energizes and market-based measures (CORSIA).

Table 7.1 Data with CAEP Members, structure, terms of reference and conference are often found by:

<p style="text-align: center;">CAEP Members (States only)</p>	<p style="text-align: center;">CAEP Members area unit</p> <p>specialists allotted by their States to required half in and contribute considerably to the board of trustee's work.</p> <p style="text-align: center;">CAEP Members reserve the privilege a ballot moves or second movements or corrections in conversations of the board.</p>
<p style="text-align: center;">CAEP Observers (States and Organizations)</p>	<p style="text-align: center;">CAEP Observers area unit</p> <p>specialists allotted by States, worldwide non-administrative associations, international organization bodies and native State associations to bring their explicit views that might not in any case be accessible to crafted by CAEP.</p> <p style="text-align: center;">CAEP Observers reserve the privilege to participate in conversations of the CAEP nevertheless while not the choice to forged a ballot, move or second movements or corrections.</p> <p style="text-align: center;">The most extreme variety of CAEP Observers from worldwide nongovernmental associations is 10.</p>

The CAEP submits reports of its typical gatherings to the Council that so alludes such reports to the Air Navigation Commission for a elementary survey and will, at its prudence, likewise hint such reports to the air transportation Committee for a starter audit of pertinent bits of the report.

The Air Navigation Commission or probably the air transportation Committee can introduce provides details concerning their separate starter surveys to the Council for its thought. The Council audits and embraces the suggestions from CAEP, as well as alterations to the SARPs, and consecutively reports to the International Civil Aviation Organization Assembly.

The Assembly changes and updates the International Civil Aviation Organization arrangements and works on regarding natural assurance. Gathering Resolutions A40-17, A40-18 and A40-19 provide the most recent arrangements and practices.

Environmental protection alludes to any action to stay up with or reinstate the character of ecological media through preclusion the emanation of poisons or change the presence of contaminating substances in ecological media. it'd comprise of:

- Progressions in attributes of labor and merchandise.
- Changes in utilization styles.
- Changes current ways.
- Treatment or removal of residuals in isolated natural assurance offices.
- Reusing.
- Avoidance of debasement of the scene and biological systems.

Important Environmental Tools:

knowledge on the attendant natural apparatuses created and maintained with by International Civil Aviation Organization are often found here these area unit for the most:

- ICAO Carbon Emissions Calculator.
- ICAO inexperienced conferences Calculator.
- ICAO Fuel Savings Estimation Tool.

- Natural advantages Tool (EBT).
- Minimal Abatement value (MAC) Curve Tool.
- ICAO E-adapting Course on State Action Plans.
- Eco-Airport Toolkit E-assortment.
- ICAO CORSIA CO2 Estimation and news Tool (CERT).

CONTINUOUS OBSERVATION AND BUSINESS REPORTS

Assurance of networks against effects of activity of air terminals associated preclusion corruption of private satisfaction within the areas of air terminals got to be directed through a continuous and dynamic method.

Continued, ordinary, and easy perceptive and evaluations on the depot execution concerning ecological components area unit a locality of the interaction.

This implies really viewing the made unsettling influence, as well as discharges, clamor, clog, and wastage, during a given timeframe to examine initial, notwithstanding whether or not the plans were dole out as anticipated and second whether or not the actions were powerful and therefore the results are edible.

During this progression, community to the pre-arranged reports got to be ensured.

The implications of evaluations and reports got to be simple and with none drawback hospitable acquire and continue with the trust of communities.

By illustrating a promise to inexperienced drives, air terminals can work on their associations with neighborhood networks, and this might ultimately prompt less resistance from close networks to future growth.⁴⁴ as an example, Sydney flying field in its atmosphere Strategy for 2010-2015, considers giving progressive ecological knowledge to the native space and creating freely accessible knowledge on key ecological accomplishments as a number of the objectives of its activity arrange.

CONCLUSION TO PART 7

Assurance of networks against effects of activity of air terminals and preclusion corruption of private satisfaction within the areas of air terminals got to be directed through never-ending and dynamic method.

Continued, ordinary, and easy perceptive and evaluations on the depot execution concerning ecological components area unit a locality of the interaction.

The International Civil Aviation Organization ESAF Regional workplace, beneath the direction of the International Civil Aviation Organization Headquarters, offers assistance on aeronautics ecological security to the twenty-four States beneath its umbrella. this is often to figure on the natural exhibition of flight within the Region.

The ESAF Region's ecological wants vary from facilitate with knowledge on property Aviation Fuels (SAFs), Carbon compensative and Reduction theme for International Aviation (CORSIA) execution.

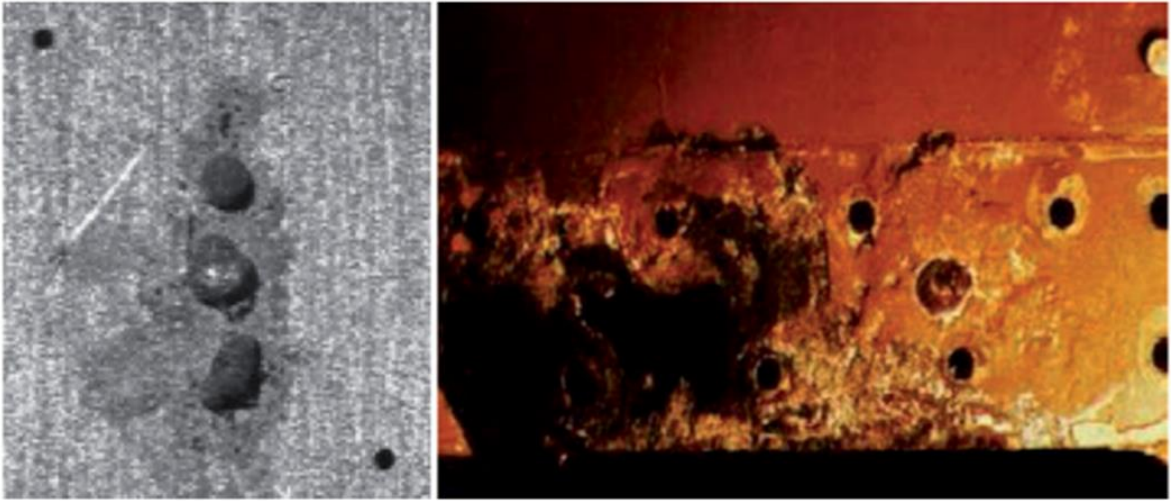
APPENDIX



Fretting Corrosion Experts



Slat bracket crack



Corrosion pits on the surface



Galvanic corrosion between magnesium surface and steel connections



Hidden corrosion

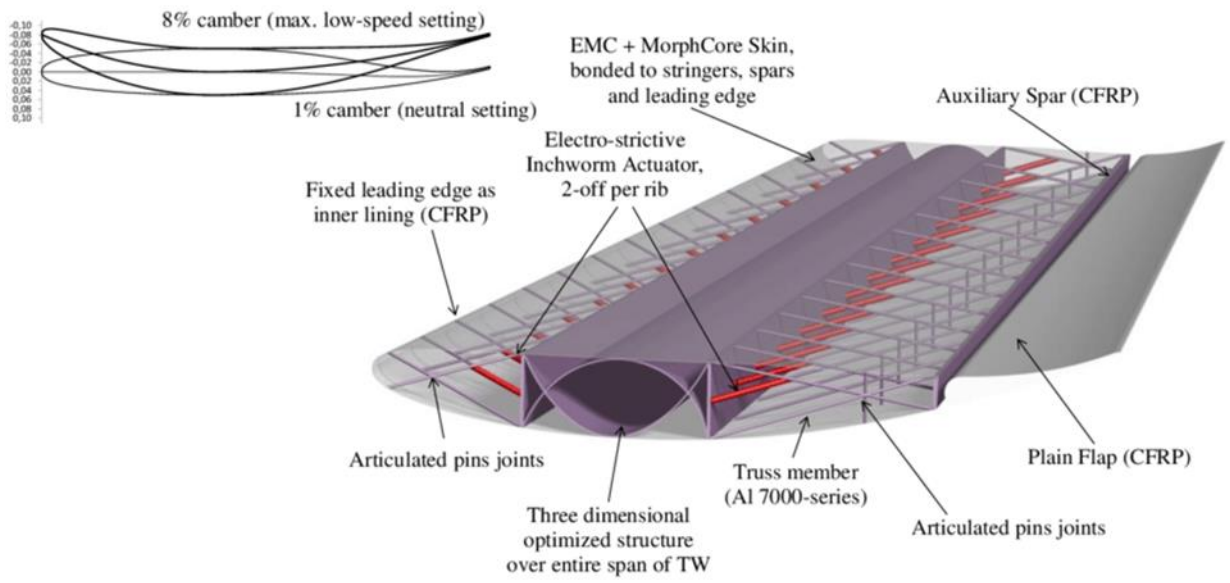
Note:

Hidden corrosion is a type of degradation of the material which is not detectable visually or by surface techniques.



Corrosion of elevator trims tabs

route camber of 5.0% is predicted to take 1.5 s.



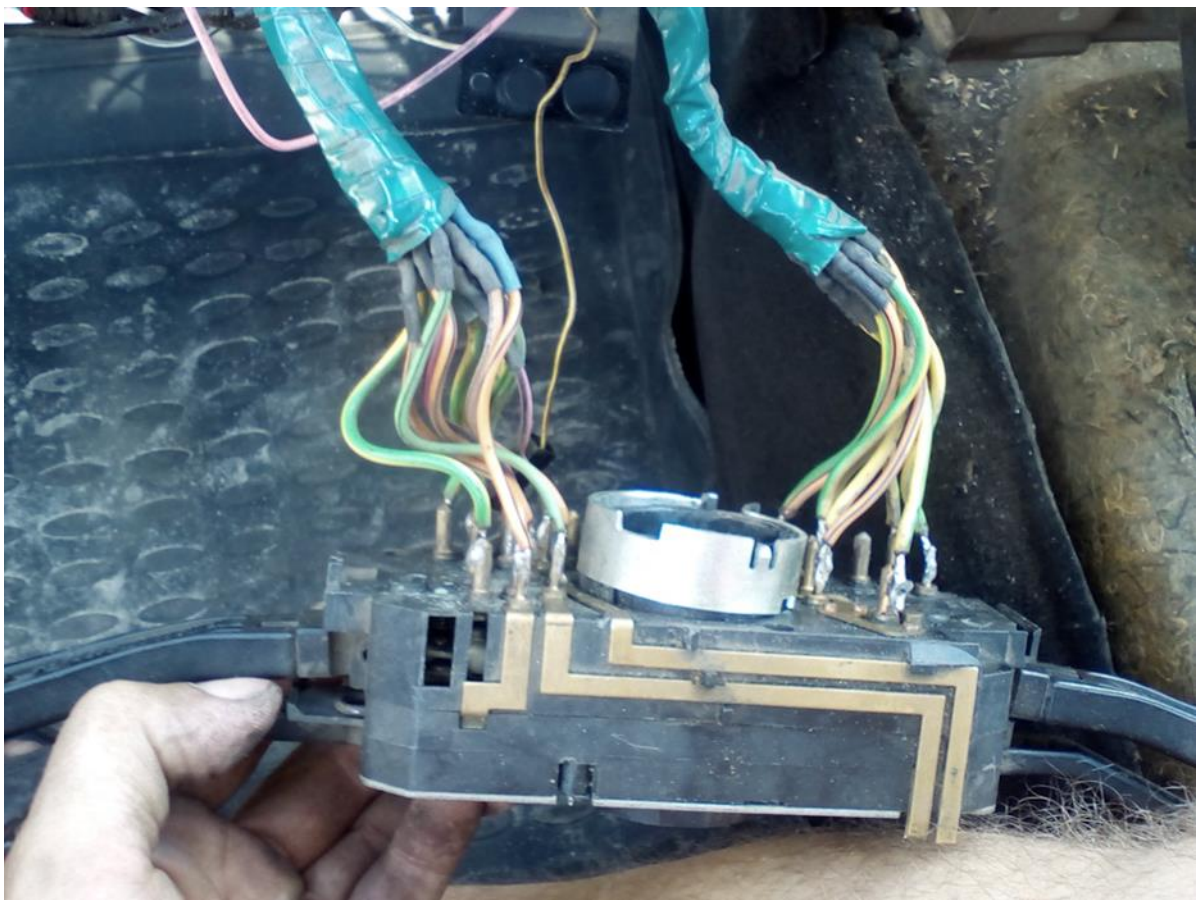
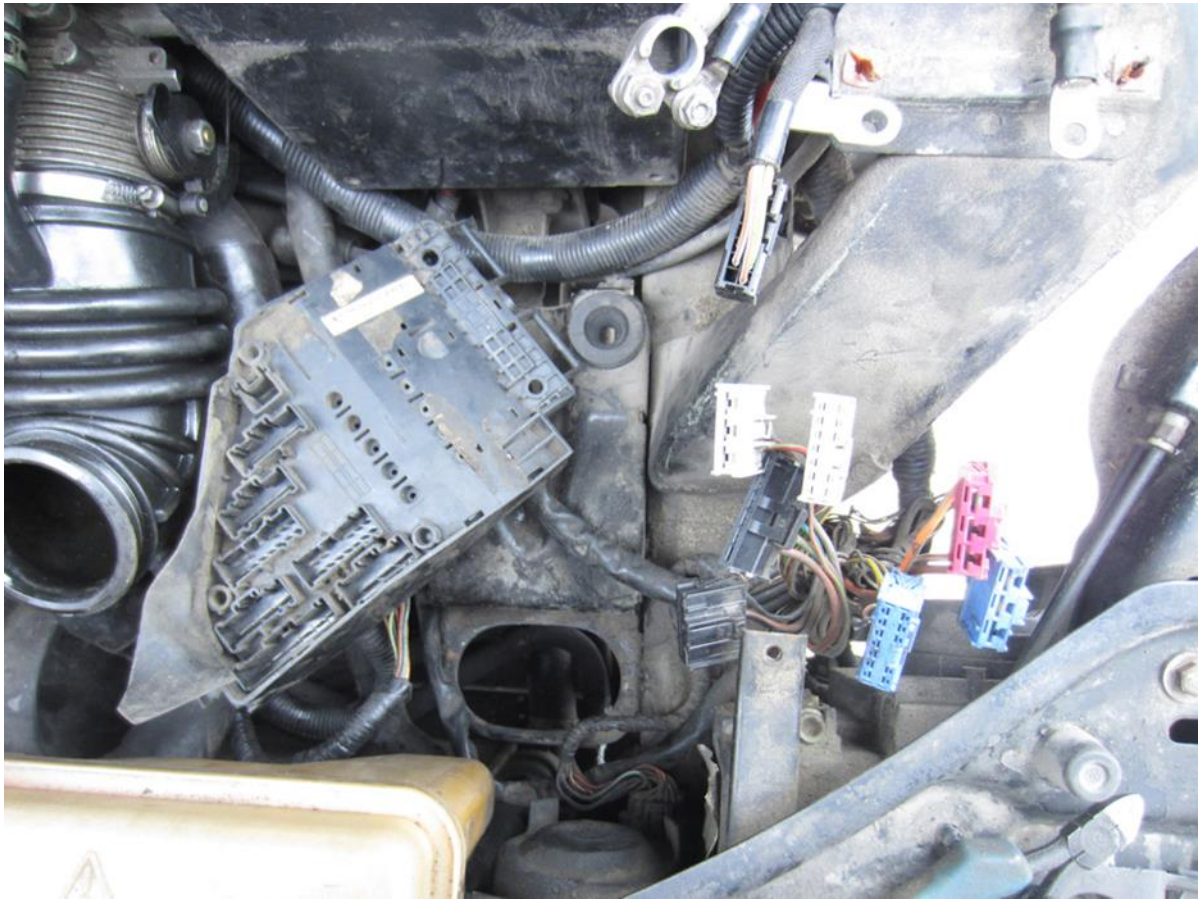
Schematic illustration of the adaptive Top Wing design



Elevator Trim



Right nacelle the wire breaks corrosion of terminals hinges



Wire break in the wiring braid under the left wing

QUALIFYING CONCLUSION

Considering the specialized hardware of the endeavor, the capabilities of the work force, adequate involvement with the upgrade and modernization of airplane of the "An" type at the venture, it ought to be noticed that, beginning around 1992:

- A full pattern of update of An-32 airplanes has been worked out and dominated.
- Worked out and dominated the complex of deals with modernization of An-32 airplane as per the documentation of the Engineer.

Dismantling the condition of the An-32 planes of the Indian Aviation based military, there is full motivation to recognize that to guarantee pragmatic endurance and flight security, the Client deliberately accommodated the challenge to fix plane that had actually been fixed at the Client's base.

Considering the authentic specific state of these planes, which have been in real life starting around 1984, similarly as the particular capacities to guarantee fix and modernization of the endeavor and the foundation of the Client, it ought to be seen a positive subject of sending the An-32 planes for fix to the undertaking later the past fix at the Client's base.

Objective information on the authentic state of the market for plane fix organizations made by ANTONOV SE shows that the endeavor is at present the figuratively speaking colossal association certified according to International Aviation Regulations and Principles, which can play out a full extent of work on overhaul upkeep and modernization of plane of the sort An-32 and their parts.

The results of the examination of the real specific condition of the plane appearance up for fix show that the mass number of fundamental flaws in the plan structures and social occasions were not totally cleared out or prevented during the past fix at the Customer for fair-mindedly sensible reasons, because of the tremendous volumes of these fixes.

Nonappearance of association with redesign, a sufficient number of qualified workforce, a totally recorded quality system, an insufficient proportion of equipment spare parts and concentrated capacities to perform astounding fixes in full,

Scattering of positive involvement with the execution of enlisted functional issue recognition and fix cards for An-26 airplanes units of enrollment of the European Union, created as per the EU Aviation Rules PART-145 for the An-32 airplanes.

Spread of involvement with the production of extra parts for An-26 airplane enlisted by the European Union for An-32 airplanes with the issuance of individual mechanical international IDs and affirmation of exceptional assembling processes.

Modernization of the flight information registration and processing system in terms of replacing the Tester-U3 product with the BUR-4-1.

While using examining complex repairable frameworks, it isn't sensible to expect that upkeep activities return the framework to an all-around great state. The power law model that is utilized to foresee combined number of disappointments accepts that there is insignificant fix when support is performed.

In this manner, support cost per unit time will keep on expanding for the existence of the framework when the power law model boundary beta is more noteworthy than one.

This article tends to framework redesign, a technique for reestablishing the framework to an all-around great state, and shows the computations associated with limiting upkeep cost per unit time by advancing the time between updates.

Different kinds of vehicles might be utilized rather than those given in the List yet their result boundaries ought to conform to those predefined above.

With the plane motors working, the assistance faculty ought doesn't remain in the plane propellers and stream efflux freedom regions.

REFERENCES

1. Suresh S., Ogaji S., Singh R. and Probert D. Engine-fault diagnostics: An optimization procedure, *Journal of Applied Energy*, vol. 73, issue 1, pp. 47-70, 2002.
2. Stepushkina OP, Popov OV, Korsunenkov MV, Slepukhina IA Logical model of diagnosing TRDD taking into account intermittent damage of its flowing part // *Visnyk of NAU*. – K: - 2007. - №1. - P. 142-145.
3. NPAOP 63.23 - 1.0 - 98. Rules of labor safety during maintenance and repair of aircraft. Introduction 01.01.99.
4. Zhitomirskiy G.I. Aircraft design: A textbook for students of aviation specialties of universities. -M: Mashinostroenie, 1991.
5. For A. Perception and pattern recognition. - Moscow: Mechanical Engineering. - 1989. –272 p.
6. Aircraft. Design: Lecture course / M.V. Karuskevich, T.P. Maslak. - K: NAU, 2013-176p.
7. Panin VV Method for determining gas-dynamic parameters of gas turbine engines of limited controllability in non-transient modes // *Visnyk of NAU*. –2001 - №4. - P. 21-24.
8. Kopytov E., Labendik V. and Yunusov S. Expert systems for evaluating the aircraft power plants 'technical condition, *Journal of Transport and Communication*, vol. 11, no. 1, pp. 31-37, 2010.
9. Dubrovin VI, Subbotin SA, Boguslaev AV, Yatsenko VK Intelligent tools for diagnosing and predicting the reliability of aircraft engines. - Zaporozhye: OAO Motor-Sich. - 2003. - 279 p.
10. Layout and centering of the aircraft: Methodical instructions. -K.: KIIGA, 1989.
11. E. Ntantis, P. Botsaris. Diagnostic Methods for an Aircraft Engine Performance. *Journal of engineering science and technology review*, November 2015, pp. 1-20.

12. Dmitriev SO, Kucher OG, Popov OV Estimation of technical condition of flowing part of gas turbine engine according to working process parameters // Bulletin of the Engineering Academy of Ukraine. - Mykolaiv, 2009. - №1. - P. 8-11.
13. Guidelines for the implementation and graduation of the graduation project. - Kiev: KIIGA, 1988.
14. M. Kulyk, S. Dmitriev, O. Yakushenko, O. Popov. The method of formulating input parameters of a neural network for diagnosing gas-turbine engines // Aviation, Volume 17, Issue 2, p. 52-56.
15. Gatto E. Lo., Li Y. G. and Pilidis P. Gas turbine off-design performance adaptation using a genetic algorithm, International 51st ASME Turbo Expo, Barcelona, Spain, 2006.
16. Epifanov SV, Kuznetsov BI, Bogaenko IM, Grabovsky GG Synthesis of control systems and diagnostics of gas turbine engines. - K. Техника. - 1998. - 312 p.
17. Kucher OG, Yakushenko OS, Sukhorukov V. Yu. Optimization of a method of training of a neural network for recognition of a class of a technical condition of GTD // Aviation - space equipment and technology. - H. : - 2007. - № 1/15. - P. 184-188.
18. Tang G., Yates CL, Zhang J. and Chen D., A practical intelligent system for condition monitoring and fault diagnosis of jet engines, AIAA / ASME / SAE / ASEE Joint Propulsion Conference and Exhibit, 35th, Los Angeles, CA. 1999.
19. Siu C., Shen Q. and Milne R. Reinforcing fuzzy rule-based diagnosis of turbo machines with case-based reasoning, IPS Press, vol. 12, no. 2, pp. 173-191, 2008.
20. Guidelines for the implementation of undergraduate works for foreign students in the direction 6.070103 "Maintenance of aircraft." - Kiev: NAU, 2012.
21. Dmitriev SA Diagnosis of a flowing part of GTD on the established and not established operating modes: dis. ... Doctor of technical sciences Sciences: 05.22.14 / Dmitriev Sergey Alekseevich. - K., 1996. - 356 p.
22. Lee Y. G. Performance-analysis-based gas-turbine diagnostics: A review, Proceedings of the Institute of Mechanical Engineering, Part A: Journal of Power and Energy, vol. 216, no. A5, 2002.

23. Chelyukanov I.P. The layout and alignment of the aircraft. - К .: КИГА, 1989.
24. Methods of compiling an analysis of the reliability of aircraft by operators. Put into effect by the order of the State Service of Ukraine for Aviation Safety Supervision № 168 dated 05.03.2005.
25. Isaenko VM, Krivorotko VM, Franchuk GM ecology and environmental protection. Thesis design: Textbook. way. - К .: КНИЖКОВЕВИД-ВО НАУ, 2005. –192 с.
26. Rothstein AP. Intelligent identification technologies: fuzzy sets, genetic algorithms, neural networks. Vinnytsia: UNIVERSUM-Vinnytsia, 1999. - 320 p.
27. Sagittarius VE Information technology for diagnosing complex technical systems in the conditions of uncertainty of input data: monograph /V.E. Sagittarius, E.M. Угрюмова, Ю.А. Воробьев, М.Л. Ugryumov. - Н.: Nat. aerospace Univ. NE Zhukovsky "Kharkov. aviation. Inst, 2016. - 104 p.
28. The design and durability of aircraft: Textbook / Zh.S. Chernenko, N.G. Sabitov, V.V. Garage and others - К .: КИГА, 1985.
29. Vargaftik NB Handbook of thermophysical properties of gases and liquids. - М .: Fizmatgiz, 1963. - 708 p.
30. Ross T.J. Fuzzy logic with engineering applications, Second Edition, John Wiley & Sons, 2004.
31. Kucher AG, Dmitriev SA, Popov AV Determination of the technical condition of the turbojet engine according to experimental research using neural networks and methods of pattern recognition // Aviation - space technology and technology. - X .: - 2007. - № 10/46. - P. 153-164.
32. Uniform airworthiness standards for civil transport aircraft of the CMEA member countries. - М .: TsAGI, 1985.
33. Ogali SOT, Li YG, Sampath S. and Singh R., Gas path fault diagnosis of a turbofan engine from transient data using artificial neural networks, ASME paper GT 2003-38423, ASME TURBO EXPO 2003, Atlanta Georgia, USA June 16 -19, 2003.
34. Kulik NS Parametric methods for assessing the technical condition of aviation gas turbine engines in operation. - К .: КИИГА. - 1993. - 139 p.

35. Fast M., Assadi M. and De S., Development and multi-utility of an ANN model for an industrial gas turbine, *Journal of Applied Energy*, vol. 86, no. 1, pp. 9-17, 2009.
36. Garage V.V. *Aircraft design: Tutorial*. - K.: KMUGA, 1998.
37. Medvedev VS, Potemkin VG *Neural networks. Matlab 6 / Under common ed. V.G. Potemkin*. - M.: ДИАЛОГ-МИФИ, 2002. - 496 с.
38. Rutkovskaya D., Pilinsky M., Rutkovsky L. *Neural networks, genetic algorithms and fuzzy systems: Per. from Polish*. - Moscow: Hotline - Telecom, 2004. - 452 p.
39. Dmitriev SO, Popov OV, Potapov VE *Prospects for the use of automated systems for diagnosing gas turbine engines based on hybrid genetic algorithms // Proceedings of the XII International Scientific and Technical Conference "AVIA-15"*. - K.: NAU, 2015. - P. 20.46-20.49.
40. Popov AV *Investigation of the dynamic characteristics of the turbojet engine with intermittent faults of the flow part on the established modes of its robot // Aviation - space engineering and technology*. - X.: - 2007. - №2 / 38. - P. 63-67.
41. Dmitriev SO, Yakushenko OS, Popov OV, Potorocha OM, Excavators Nasser. *The method of forming the initial and test arrays of the neural network for diagnosing a gas turbine engine // Aerospace Engineering and Technology*. - H.: -2012. - № 7/94. - P. 202 - 207.
42. *Aircraft design: A textbook for universities / edited by Eger S.M.*-M.: Mashinostroenie, 1983.
43. Tereshchenko YM, Kapitanchuk KI *Theory of aircraft gas turbine engines. Textbook*. - K.: KIVPS. - 1997. - 464 p.
44. *Aviation and the environment*, International civil aviation organization P. 8 to 14.
45. Kucher OG, Dmitriev SO, Popov OV, Tyshkevich OV *Complex method of TRDD state recognition with the use of neural networks and image recognition methods // Aerospace Engineering and Technology*. - H.: - 2008. -№ 10/57. - P. 51-61.

46. Dmitriev SA, Popov AV Construction of a portrait of malfunctions of the flowing part of a gas turbine engine on the example of AI-25 // Automation.
47. Selection parametrov and calculation of the masses of the aircraft: Methodical instructions. - K .: KIIGA, 1989. 46 p.
48. Aviation rules. Part 25. Airworthiness standards for airplanes of the transport category. - M .; POPPY. 1993.
49. Aviation rules. Part 25. Airworthiness standards for airplanes of the transport category. - M .; POPPY. 1993.
50. Dmitriev SA Diagnosis of the flow part of gas turbine engines in transient modes. - K .: KMYTA, 1996. - 120 c.
51. Pashaev AM, Abdullaev PS, Yakushenko AS, Mirzoev AD Neural network recognition of the technical condition of aircraft gas turbine engines // Bulletin of the National Academy of Sciences of Azerbaijan. Informatics and management problems. - 2008. - № 3 (28). - P. 3-7.
52. Sosunov VA, Litvinov Yu.A. Unsteady modes of operation of aircraft gas turbine engines. M: Mechanical engineering. - 1975. - 216 p.
53. Analysis of the reliability of the fleet of aircraft of Ukraine in 2002. State Department of Aviation Transport of Ukraine (Ukraviatrans). Entered into force by order of 15.02.2003 № 3.3-21 / 01. - 36 p.
54. Kruglov VV, Borisov VV Artificial neural networks. Theory and practice. - Moscow: Hotline - Telecom, 2001. - 382 p.
55. Stepushkina OP, Popov OV, Voznyuk AP Determination of multiple failures of the flow part of the turbojet engine by thermogas-dynamic parameters. Problems of automation and control: Collection of scientific works. K .: 2006. №1 (16). - P. 142-145.
56. Mathematical modeling of operational characteristics of gas turbine engines / Tunakov AP, Mats EV, Dmitriev SA, Panin VV, Orlanov VI - K: КИИГА, 1989. - 148 c.

57. Karvounis G. and Frith P. Automated detection of engine health using hybrid model-based and fuzzy logic approach, ISABE 2003-1232, 16th International Symposium on air breathing engines, Cleveland, Ohio, 31-Aug-5 Sept, 2003.
58. Gagarin AV Hybrid neural network algorithm for identifying the parameters of resource-intensive models [Text]: author's ref. dis. ... Cand.those. Sciences: 05.13.18 / Gagarin Alexander Vladimirovich; Ufa state. un-t. - Ufa., 2011. - 18 p.
59. GOST 4401-81. The atmosphere is standard. - Enter. 07/01/1982 - M.: Izd-vostandartov, 1981. - 180 s.
60. Wasserman P.D. Advanced Methods in Neural Computing. New York: Van Nostrand Reinhold, 1993.
61. Egortsev MV, Rybko VA, Tsarkov AP, Chernyshev LM Parametric evaluation of experimental data with the use of MM thermogas-dynamic calculation of turbojet engines // Aerospace Engineering and Technology. - H.: NAU "HAI". - 2001.
62. Dmitriev SO, Kulik MS, Moiseev BM, Panin VV Theory of aircraft engines: textbook. manual. - K.: HAY, 2001. - 204 c.
63. Popov AV Diagnosis of a flowing part of aviation turbojet doublecircuit engines: dis. ... Candidate Tech. Sciences: 05.22.20 / Popov Alexander Viktorovich. - K., 2008. - 179 c.
64. Egortsev MV, Rybko VA, Tsarkov AP, Chernyshev LM Parametric evaluation of experimental data with the use of MM thermogas-dynamic calculation of turbojet engines // Aerospace Engineering and Technology. - H.: NAU "HAI". - 2001. - Issue 26. - P. 184-185.
65. Encyclopedia of Security / NS Kulik, VP Харченко, М.Г. Lutsky et al.; under ed. N.S. Kulika. -K.: Техника, 2008. - 1000 c.
66. Bureau NI Recognition of the technical condition of objects on the basis of artificial neural networks: a monograph / N.I. Бурай, О.В. Zashchytsky. - K.: HAY, 2014. - 120 c.

67. Dmitriev SA, J. K. Agarwal, E.V. Putyatin. Classification of gas turbine states with depth of diagnosis to the node // Aviation and space technology. - H .: NAU "HAI". –2000. –Vyp.19. - P. 358-364.