



Master Minimum Equipment List (MMEL) Minimum Equipment List (MEL)

2017



A V E M E X

- Timetable
- Housekeeping
- Participant's presentation
- Safety issues
- Quality Survey



Objectives



- At the end of the course, the participants will be familiarized with the concepts, regulation, flight crew responsibilities, decision making process and the use of the MEL.
- To understand the MEL as a tool that will help the flight crew to make an optimum decision during the flight operations.



Table of Contents



- Introduction and definitions
- National and International Regulations
- Master Minimum Equipment List (MMEL)
- Minimum Equipment List (MEL)
- Pilot's Decision Making
- Using the MEL

Introduction: Airworthiness



- **Airworthiness** definition:
 - The fitness of an aircraft to fly when it meets the minimum conditions laid down in its type certificate.
 - An airworthy aircraft is one that is fit to fly. It must be operated within the limits laid down.
 - An aircraft which exceeds any limit may be judged to become un-airworthy.



Background



- ICAO was created on December 7, 1944 with the signing of the Convention on International Civil Aviation, in Chicago.
- Adoption of International Standards And Recommended Practices (ISARPs)



Background



- This convention provides the official definition of the Minimum Equipment List (MEL) in “Annex 6- Chapter 6: Aeroplane instruments, equipment and flight documents”

*6.1.2 “The operator shall include in the operations manual a minimum equipment list (MEL), approved by the State of the Operator which will enable the pilot-in-command to determine whether a flight may be commenced or continued from any intermediate stop should any instrument, equipment or systems become inoperative(...)the State of the Operator shall ensure that the MEL does not affect the aeroplane’s compliance with the airworthiness requirements applicable in the State of Registry.” **

** Extract 1 from the ICAO Convention*



*“If deviations from the requirements of States in the certification of aircraft were not permitted an aircraft could not be flown unless all systems and equipment were operable. Experience has proved that some unserviceability can be accepted in the short term when the remaining operative systems and equipment provide for continued safe operations.”**

*** Extract 2 from the ICAO convention**

- Without the MMEL, the aircraft could not fly with inoperative equipment
- The main purpose of the MMEL is to enable an aircraft to be dispatched for a limited period of time
- The development of the approved MMEL is not a requirement for the aircraft Type Certificate
- The manufacturer responsibility is to develop the MMEL, the Authority may approve it

The Master Minimum Equipment List



- A Master Minimum Equipment List (MMEL) is an approved document created specifically to regulate the dispatch of an aircraft type with inoperative equipment
- It establishes the aircraft equipment allowed to be inoperative under certain conditions for a specific type of aircraft and still provide an acceptable level of safety
- The MMEL contains the conditions, limitations and procedures required for operating the aircraft with these items inoperative.

The MMEL forms the basis for development and review of an individual operator's Minimum Equipment List (MEL)

Methods of justification of MMEL Items



The assessment of an acceptable level of safety for a MMEL item often involves more than one of the following methods of justification:

- a) the equipment may be considered optional;
- b) the equipment may be considered redundant;
- c) a quantitative safety analysis; and/or
- d) a qualitative analysis.

Methods of justification of MMEL Items



Optional Equipment:

When aircraft are approved with optional equipment on board which is over and above the required equipment, there is no necessity for such equipment to be operative if it is in excess of that required for safe operations for a particular flight condition or route of flight.

Inclusion in the MMEL can be accepted on this basis.

Methods of justification of MMEL Items



Redundant Items:

If the purpose or function of the considered component/system can be carried out by some other items of equipment, then it may be accepted on a redundancy basis with the provision that the alternative equipment can be confirmed to be operative.

Redundancy cannot be claimed as justification for inclusion of an item if the two (or more) sources of the function or information are required by the aircraft type certification basis. In this case, another means of justification such as the safety analysis method must be used.

Methods of justification of MMEL Items



Quantitative Safety Analysis

- It is a structured technique to achieve the necessary level of safety, based upon the principle that the hazard resulting from an event should be inversely proportional to the probability of its occurrence.
- Compliance is usually demonstrated by conducting a system safety assessment
- The safety assessment establishes the major, hazardous or catastrophic situations or failure conditions which the system is capable of producing and the allowable probability of occurrence

Methods of justification of MMEL Items



Effect	Consequences of the failure
No Safety effect	No effect on safety.
Minor	Airworthiness is not significantly affected, and any actions are well within the capacity of the crew.
Major	Results in: • A significant reduction in safety margins or functional capabilities, or • A significant increase in crew workload or crew efficiency impaired, or • Physical distress to passengers, or cabin crew, or flight crew.
Hazardous	Results in: • A large reduction in safety margins or functional capabilities, or • Physical distress or excessive workload such that the flight crew cannot be relied upon to perform their tasks accurately or completely, or • Serious or fatal injury to a relatively small number of the occupants other than the flight crew.
Catastrophic	Results in the loss of the aircraft and/or in multiple fatalities.

Methods of justification of MMEL Items



Qualitative Safety Analysis

This analysis must be used to consider the impact that the proposed inoperative item has on all other aspects of the aircraft's operation.

The qualitative analysis must consider the impact on crew workload, the impact of multiple MMEL items, and the complexity of maintenance and/or operational procedures.

It may reflect experience with previous MMEL approvals.

Introduction: MMEL - MEL



- The MMEL and the MEL are both designed to ensure that an acceptable level of safety is respected, when an aircraft is dispatched with inoperative equipment.
- The MEL enables Operators to rapidly dispatch an aircraft, and avoid unnecessary delays or flight cancellations, without sacrificing safety.

The objective of the MMEL is to ensure:

- An acceptable level of safety, while operating an aircraft with inoperative equipment
- Aircraft profitability by avoiding Aircraft On Ground (AOG) situations.

**Acceptable
Level of Safety**



Profitability



- Depending on their impact on the safety of a flight, the MMEL and the MEL consist of component and system lists that are attributed to:
 - “GO” or “GO IF” items can remain inoperative for a limited period of time.
 - “NO GO” items prevent the dispatch of the aircraft.

Concepts: Safe Dispatch



- When an aircraft is dispatched by application of the MMEL/MEL, an acceptable level of safety is maintained by:
 - The transfer of a function to another piece of equipment (redundancy), or
 - The provision of required data by another piece of equipment (standby instruments), or
 - The compliance with adequate limitations and/or procedures (flight crew and/or maintenance procedures).

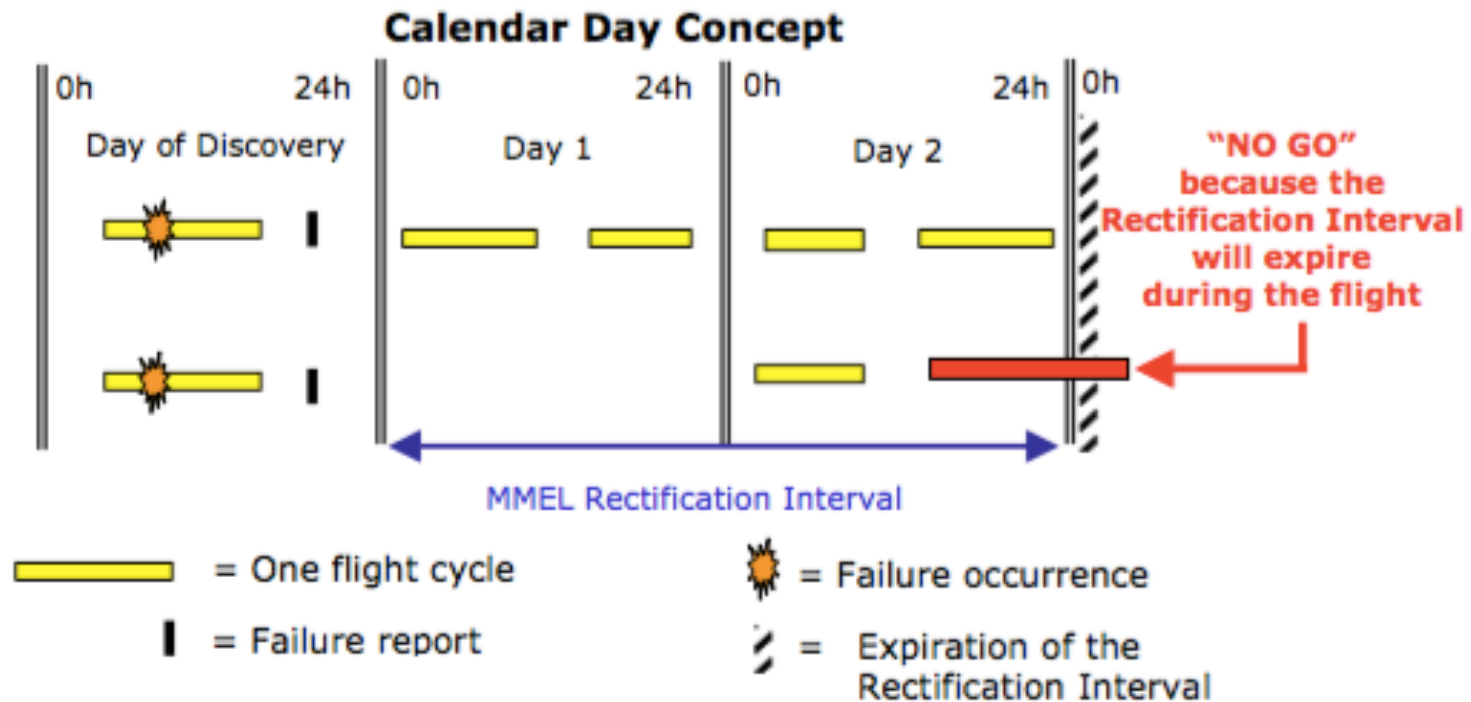
Concepts: Rectification intervals



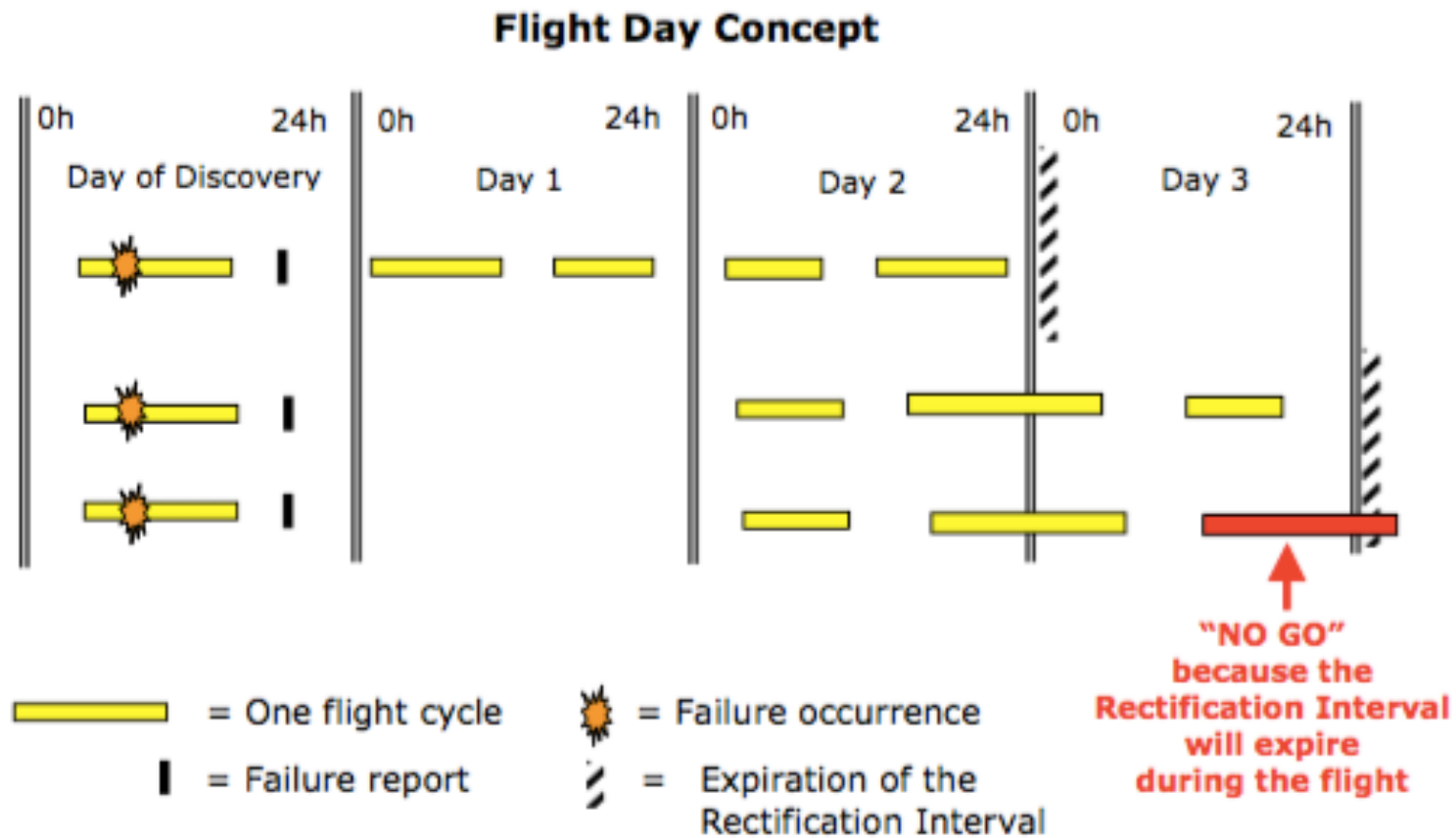
- To maintain this “acceptable level of safety”, and to prevent degraded maintenance, the MMEL establishes limitations on the amount of time that an aircraft can be operated with inoperative items.

Rectification Intervals	A	B	C	D
Consecutive Calendar Days (excluding the day of discovery)	No standard Rectification Interval (refer to dispatch conditions)	3	10	120

Concepts: Calendar Day



Concepts: Flight Day



National Regulation



- CO AV-07.3/07.- “lista de equipo de comunicación y navegación y despacho de aeronaves que debe de efectuarse conforme al MEL.”
- NOM-018-SCT3-2012: “contenido del Manual de Vuelo.
Nota: el requerimiento del MEL esta como Apéndice Normativo "A"”
- NOM-012-SCT3-2012
“requerimientos para los instrumentos, equipo, documentos y manuales que han de llevarse a bordo de las aeronaves.”



MMEL/MEL Legal Bases

The applicable documents that serve as the reference for the creation of the MMEL and the MEL are provided by either Joint Aviation Authorities (JAA) or Federal Aviation Administration (FAA) documents.



International Regulation



Part 129:

“ (1) A master minimum equipment list exists for the aircraft type.

(2) The foreign operator submits for review and approval its aircraft minimum equipment list based on the master minimum equipment list, to the FAA Flight Standards District Office having geographic responsibility for the operator. The foreign operator must show, before minimum equipment list approval can be obtained, that the maintenance procedures used under its maintenance program are adequate to support the use of its minimum equipment list.”

Responsabilities



- The PIC is legally responsible for determining the airworthiness of the aircraft; therefore, he is responsible for the correct use of the MEL
- The PIC, must assure the maintenance log registration (log book) that any equipment, component or system is inoperative or has been removed.
- The MEL only applies for dispatch and pre-flight of the aircraft. If a system fails during the flight, the PIC has the responsibility of determining the possible consequences of the system failure, the airworthiness implications and set the new course of action.

Limits of MEL Applicability



- According to the JAR MMEL/MEL.001, an MEL is applicable up to the commencement of the flight (i.e. the point when the aircraft begins to move under its own power, in preparation for takeoff)
- In some cases, the MEL may need to be consulted in flight, in order to decide if it is necessary to perform an in-flight turn back
- However, any decision to continue the flight must be subject to pilot judgment
- If there is an in-flight failure, the FCOM (or equivalent) provides the procedures and limitations that the flight crew should apply

Limits of MEL Applicability



JAR MMEL/MEL.001 limits the MEL application up to the “commencement of flight”.

According to JAR-MMEL/MEL.005, the “commencement of flight” is: *“The point when an aircraft begins to move under its own power for the purpose of preparing for takeoff”*.

However, if a failure occurs during the taxi phase, before the start of the takeoff roll, any decision to continue the flight must be **subject to pilot judgment and good airmanship** (Refer to ACJ-MMEL/MEL.001 in JAR-MMEL/MEL).

The procedures for handling these failures must be defined by the Operator in the MEL.

Limits of MEL Applicability



The FAA policy regarding MEL applicability is provided in the Air Transportation Operations Inspector's Handbook 8400.10. *Chapter 4 – Section 4: MEL Use in Service.*

“The MEL is not applicable to discrepancies, or malfunctions that occur, or that are discovered in flight. When the flight has departed, the flight crew must deal with any equipment failure in accordance with the AFM.”

According to the FAA, the “departure of flight” is: “*The time that the aircraft begins movement for the purpose of takeoff*”.

To clarify the expressions: “**Departure of a flight**”, or “**time for dispatch or release**”, the FAA has published the Policy Letter N°88 (PL-88). The PL-88 explains the FAA policy for the handling of a system failure that is discovered after “blocking out”, before takeoff. The aim of this PL is to clarify the action to be taken by the Operator, and its personnel, when discovering a failure after the aircraft departs from the block.

The “departure of a flight” is interpreted as the time when the aircraft is either pushed-back from the blocks, or is towed from the blocks for the purpose of takeoff.

Limits of MEL Applicability (PL-88)



*“The Procedure should provide for the pilot in command to be able to communicate with the **d**ispatch and **m**aintenance organizations, if required, to review the situation and determine whether the flight should:*

- 1) Return to the blocks for repairs (the failed equipment is a “NO GO” item), or*
- 2) Return to the blocks to accomplish an (m) procedure specified in the MEL before continuing the flight, or*
- 3) Continue using the alternate procedure (abnormal procedure) for operating with that failed item.*

Limits of MEL Applicability (PL-88)



The procedure may also provide for the flight to continue when the pilot in command determines that the flight can be operated safely using the alternate procedure under the conditions of the dispatch release, without communicating with the dispatch and maintenance organizations.

Note that if as in other cases, the conditions for a flight are changed to the extent that the original dispatch or flight release is no longer valid, then a new dispatch or flight release or an amended release is required.”

Dispatch for MEL purpose: Helicopter



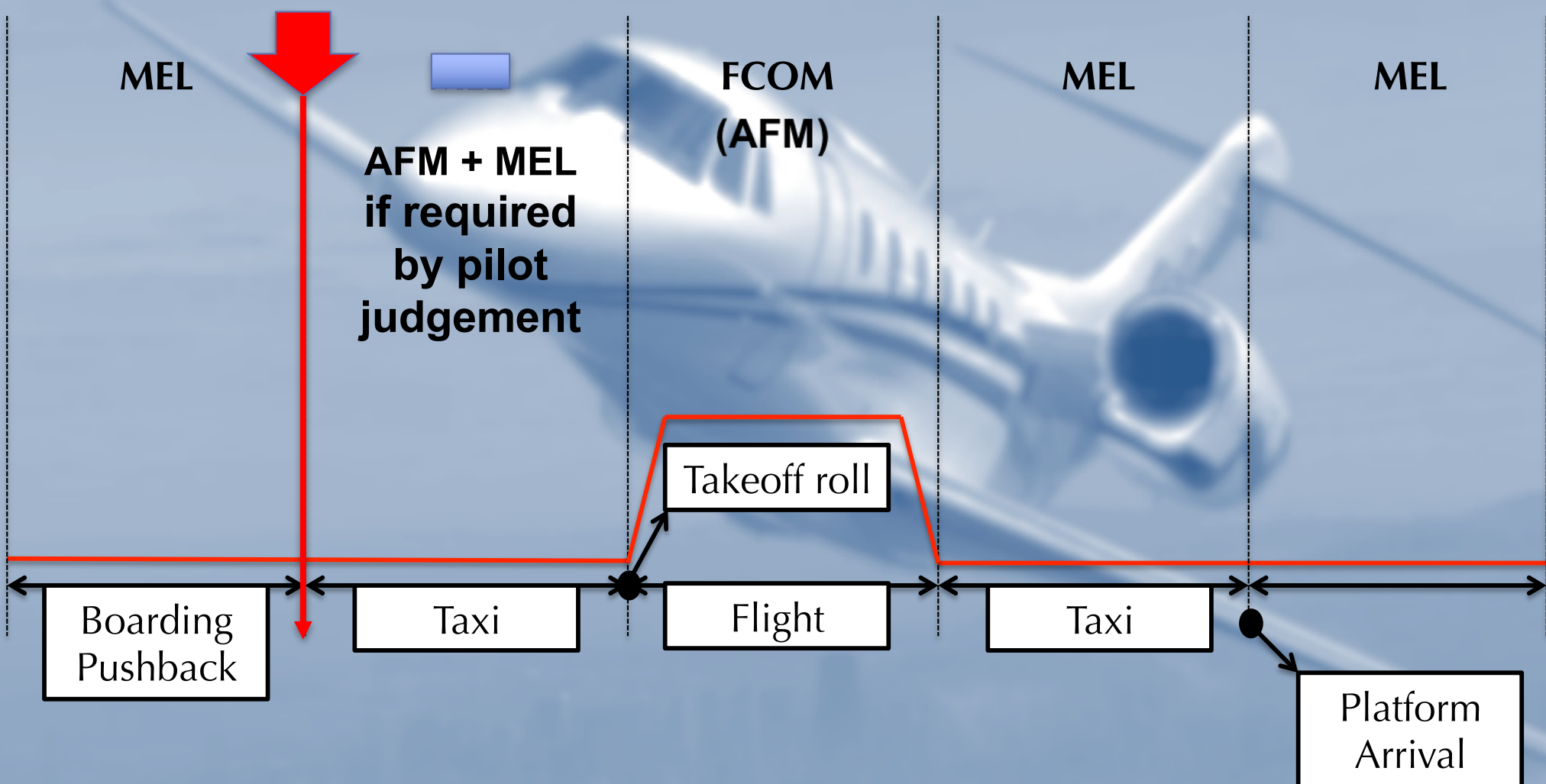
- The moment when the helicopter commences air or ground taxi.

- The Operator's MEL, shall include procedures to deal with any failures which occurs between the start of taxi or push back and takeoff brake release
- Any failure which occurs after takeoff commences shall be dealt with as an in-flight failure. Refer to the aircraft flight manual.
- After takeoff, no MEL action is required until the completion of the next landing.

Limits of MEL Applicability



Commencement of the flight or Flight Departure



- Portrait
- Revision Control
- Effective pages list
- Index or Table of Contents
- Symbols and Definitions

*The MMEL and MEL uses code ATA (Air Transport Association)

Air Transport Association (ATA) 100 Aircraft System Specifications

Note: This list is not comprehensive and does not include subsystems. It is intended only to give a general overview of the ATA 100 groupings.

Group : Airframe				Group : Power Plant				Group : Structure	
1.	General	23V	Digital Voice	34C	TCAS	70	Standard Engine Practice	16	Sound
2	Power Off	24	Electrics	34D	Doppler, TANS	71	Powerplant	45	Active Schematics
3	Minimum Equipment Requirement	25	Equipment Furnishings	34E	EFIS, EIS Ctrl/Select	72T	Engine Turbine	51	Structures
4	Flight	26	Fire	34F	FMC, PMS	72R	Engine Reciprocating	52	Doors
5	Operational Spec./ Time	27	Flight Controls	34G	Ground Proximity Warning System	73	Engine Fuel Control	53	Motion Hardware
6	Dimensions	27E	EFCS (Fly by Wire)	34H	Windshear	74	Engine Ignition	53A	Motion Performance
7	Lifting and Shoring	27F	Flaps/Slats	34I	IRS, INS, AHRS	75	Engine Bleed Air	54	Nacelles/Pylons
8	Levelling and Shoring	28	Fuel	34N	GPS, Long Range Nav Systems	76	Engine Controls	55	Stabilizrs
9	Towing and taxiing	29	Hydraulics	34T	TMS	77	Engine Indicating	56	Wiindows
10	Parking and Mooring	30	Ice and Rain	34W	Weather Radar	78	Engine Exhaust	57	Wings
11	Placards	31	EIS Warning ECAM, EICAS	35	Oxygen	79	Engine Oil	60	Standard Practices
12	Servicing	31A	DEFDAU (MD90) ADAS (MD11)	36	Pneumatics	80	Engine Starting	62	Propellers
16	Sound	31R	AIDS	37	Oxygen	81	Turbines	63	Rotors
20	Standard Practice Airframe	31W	CAWS, MAWEA, WES	38	Warter / Waste	82	Engine Injection	64	Rotor drive
21	Air Conditioning and Pressurization	32	Landing Gear Brakes	39	Electrical Panels Parts	83	Accessory Gearboxes	65	Tail Rotor
22	Autoflight	33	Lighting	45	BITE, CMC	85	Visual	66	Tail Rotor Drive
23	Communications	34	Navigation	49	APU	91	Charts	67	Floding Pylons
23A	ACARS	34A	Flight Instruments			97	facilities	67	Rotors, Flight Drive
						99	IOS	85	Visual
								97	Hardware
								99	Instructor Facilities

- In order to maintain an acceptable level of safety, when the dispatch conditions are changed, the MMEL is amended taking the following into consideration:

- In-service events (Operator experience)
- Authorities' requirements
- System improvement
- Quality issues.
- New aircraft design.

- The MEL is a document that is used to alleviate a situation.
- Its purpose is not to encourage the operation of aircraft with inoperative equipment.
- It is not desirable for an aircraft to be dispatched with inoperative equipment, and such operations are only permitted after careful analysis of each item, to ensure that an acceptable level of safety is maintained.
- Operators must take into account the fact that the continued operation of an aircraft with inoperative items should be minimized.

MEL Principles (Review)



- The MEL should be consulted, only when a failure is completely identified and confirmed.
- The MEL is neither a troubleshooting guide nor a pre-flight checklist.
- The MEL is not applicable if there is an in-flight failure
- The MEL may be consulted in flight, only to decide whether to perform an in-flight turn back, depending on:
 - The “GO”/”NO GO” status of the failed item
 - The possibility to repair the failure at the destination

- Four general criteria must be fulfilled:

1) Equally or More Restrictive: The Operator's MEL must not be less restrictive than the MMEL, the FAR, the operations specifications, the approved Flight Manual limitations, certification maintenance procedures, or Airworthiness Directives.

2) Appropriate: The MEL must be appropriate for the applicable aircraft.

3) Specific: The operational and maintenance procedures must be specific to the aircraft and its operations.

4) Applicability: An MEL should be applicable to the FAR under which the Operator is certificated.





MINIMUM EQUIPMENT LIST

Avemex, S.A. de C.V.

XA-AVX



CESSNA 525B

SERIAL NUMBER 525B-0192

1. SYSTEM SEQUENCE NUMBERS & ITEMS			2. NUMBER INSTALLED	3. NUMBER REQUIRED FOR DISPATCH	4. REMARKS OR EXCEPTIONS
21	ENVIRONMENTAL CONTROL				
-05	Forward (FWD) (Units -0001 thru -0450)	C	1	0	(M) May be inoperative provided: a) Aft evaporator fan is operative, b) Forward evaporator fan is deactivated, c) DEFOG FAN is selected OFF, d) Windshield anti-ice system is operative, and e) A means to clear windshield of moisture is readily available.
-06	Aft (AFT)	C	1	0	(M) May be inoperative provided: a) Forward evaporator fan is operative, b) Aft evaporator fan is deactivated, and c) Cockpit and cabin temperature control system manual mode is operative and used.
-60-01	Cockpit and Cabin Temperature Control System	C	2	0	May be inoperative provided cabin pressurization system is considered inoperative (Refer to item 21-30-02).
-01	Automatic Mode	C	1	0	May be inoperative provided temperature control system manual mode is used.
-02	Manual Mode	C	1	0	May be inoperative provided temperature control system automatic mode is used.



-01	Automatic Mode	C	1	0	May be inoperative provided temperature control system manual mode is used.
-02	Manual Mode	C	1	0	May be inoperative provided temperature control system automatic mode is used.



REVISION: 01



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PAG: 21-4

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I. Rectification Intervals



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CESSNA 525B

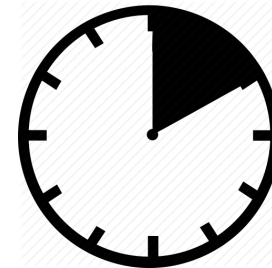
SERIAL NUMBER 525B-0192

1. SYSTEM SEQUENCE NUMBERS & ITEMS		2. NUMBER INSTALLED		3. NUMBER REQUIRED FOR DISPATCH		4. REMARKS OR EXCEPTIONS
21 ENVIRONMENTAL CONTROL						
-00B (Unpressurized)	C	1	0			May be inoperative provided cabin pressurization system is considered inoperative (Refer to item 21-30-02).
-33-01 Cabin Outflow Valve	C	2	0			(M) May be inoperative provided: a) One outflow valve is removed, and b) Cabin pressurization system is considered inoperative (Refer to item 21-30-02).
-33-02 Pressure Regulating Valve						
-00A (Pressurized)	C	2	1			(M) One may be inoperative provided: a) Affected valve is secured for no flow, b) Cabin pressurization system is operative, c) AIR SOURCE SELECT is selected to operative source, and d) Aircraft is operated at FL250 or below.
-00B (Unpressurized)	C	2	0			(M) May be inoperative provided: a) Both valves are secured for no flow, b) AIR SOURCE SELECT is selected OFF, c) Cockpit and cabin temperature control systems are considered inoperative (Refer to item 21-60-01), and d) Cabin pressurization system is considered inoperative (Refer to item 21-30-02).
-33-03 Flow Control Valve	C	2	1			May be inoperative provided both pressure regulating valves are operative.
-50-02 Vapor-cycle Air Conditioning System	C	1	0			(M) May be inoperative provided: a) Air conditioning system is deactivated, b) AIR CONDITIONING is selected OFF, c) Windshield defog is considered inoperative (Refer to item 21-21-12), d) Cabin and cockpit temperature control systems are operative, and e) All glareshield fans are operative.
-02 Compressor Light	C	1	0			

I. Rectification Intervals



- It is the maximum time allowed to operate the aircraft since the time the inoperative system is discovered, until it is repaired.
- The elements that are insignificant for a safe operation of the flight, will not have a rectification interval. Ej. passenger reading lights.
- The Intervals are:
 - A
 - B
 - C
 - D



I. Rectification Intervals



Interval A

-Must be repaired within the interval especified by the operator or manufacturer.



-When it states *cycles* or *time flight*, the interval time starts counting in the next flight.

- When the interval is “flight days”, the time starts counting in the next flight day, after the discovey.

-01A	Microphone Boom Microphone (For a holder of an Air Carrier or Commercial Operator Certificate)	A	1	0	May be inoperative provided: a) Associated hand microphone is installed and operative, and b) Repairs are made within three flight days.
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I. Rectification Intervals



Interval B:

-The elements of this class must be repaired within the next 3 consecutive days, excluding the day of the discovery.



				pilot operations.
-50-07 Push-to-talk (PTT) Switch (Failed deselected)	B	2	1	(O) One may be inoperative provided alternate procedures are established and used for transmitting.
-01 Yoke Switch				
-01A Right Yoke Switch	B	1	0	May be inoperative provided aircraft is operated single-pilot.
-05 Interphone Position (Units -0001 thru -0450)	B	2	1	May be inoperative provided VOX is selected ON on associated audio panel.
-50-08 Radio Tuning Unit (RTU 2) (Units -0001 thru -0450)	B	1	0	NOTE: Any functions or controls that operate normally may be used.

I. Rectification Intervals



Interval C:

-The elements of this class must be repaired within de next **10** consecutive days, , excluding the day of the discovery.

-01 Aileron (Each side)	C	2	1	One may be damaged or missing provided outermost wick is installed and not damaged.
-02 Wing Tip Assembly (Each side)		1	1	NOTE 1: Wing tip assembly is entire removable section outboard of fuel closure rib. NOTE 2: This static wick is required. Relief should not be taken under another installation area.
-05 Elevator (Each side)	C	3	1	Two may be damaged or missing provided outermost wick is installed and not damaged.
-08 Rudder	C	2	1	One may be damaged or missing provided uppermost wick is installed and not damaged.
-09 Stinger		1	1	NOTE: This static wick is required. Relief should not be taken under another installation area.
-70-01 Cockpit Voice Recorder (CVR)		1	1	As required by NOM-022-SCT3-2011.

I. Rectification Intervals



Interval D:

- They are optional.
- The elements of this class must be repaired within the next **120** consecutive days, excluding the day of the discovery.
- The component must be optional, and the operator has to have the possibility of deactivating or removing the item from the aircraft.

1. SYSTEM SEQUENCE NUMBERS & ITEMS			2. NUMBER INSTALLED				3. NUMBER REQUIRED FOR DISPATCH		4. REMARKS OR EXCEPTIONS	
23	COMMUNICATIONS									
-00A	(Holder of an Air Carrier or Commercial Operator Certificate)	A	1	0						May be inoperative provided: a) Any Flight Data Recorder (FDR) required to be installed is operative, and b) Repairs are made within three flight days.
-02	Underwater Locator Device (ULD)	D	1	0						May be inoperative provided device is not required.

I. Rectification Intervals



Interval D:

- 1) The “missing” component, doesn’t affect the crew workload.
- 2) The pilots do not need this element operational to perform their duties.
- 3) The pilot’s training and their procedures, don’t affect the use of the inoperative item.



II. Number Installed



- The number of equipment installed onboard the aircraft.



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SERIAL NUMBER 525B-0192

1. SYSTEM SEQUENCE NUMBERS & ITEMS		2. NUMBER INSTALLED		3. NUMBER REQUIRED FOR DISPATCH	4. REMARKS OR EXCEPTIONS
31 INSTRUMENTS					
-20-02 Clock		1	1	1	As required by NOM-012-SCT3-2012.
-20-04 Flight Hour Meter	C	1	0	0	(O) May be inoperative provided flight time is tracked by alternate means.
-30-03 Flight Data Recorder		1	1	1	As required by NOM-022-SCT3-2011.
-00B (Operator other than a holder of an Air Carrier or Commercial Operator Certificate)		1	1	1	As required by NOM-022-SCT3-2011.
-01A Flight Data Recorder (FDR) Parameters required by NOM-022-SCT3-2011.		1	1	1	Up to three (3) recording parameters may be inoperative provided: a) Cockpit Voice Recorder (CVR) operates normally, and b) Repairs are made within 20 calendar days.
-02 Underwater Locator Device	D	1	0	0	May be inoperative provided device is not required.

III. Number Required for Dispatch



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SERIAL NUMBER 525B-0192

1. SYSTEM SEQUENCE NUMBERS & ITEMS	2. NUMBER INSTALLED	3. NUMBER REQUIRED FOR DISPATCH	4. REMARKS OR EXCEPTIONS
33 LIGHTS			
-10-01 Cockpit and Instrument Lighting (Excluding button lights, standby flight instrument lighting, internally lighted annunciators, and required placard lighting)	1	1	As required by NOM-012-SCT3-2012.

IV. Remarks or Exceptions



- When the inoperative component requires any operational procedure from the crew: **(O)**
- Whenever it is required a maintenance procedure, in order to guarantee the safety of the operation: **(M)**
- When both procedures are necessary: **(O)(M)**

IV. Remarks or Exceptions



AVEMEX

MINIMUM EQUIPMENT LIST

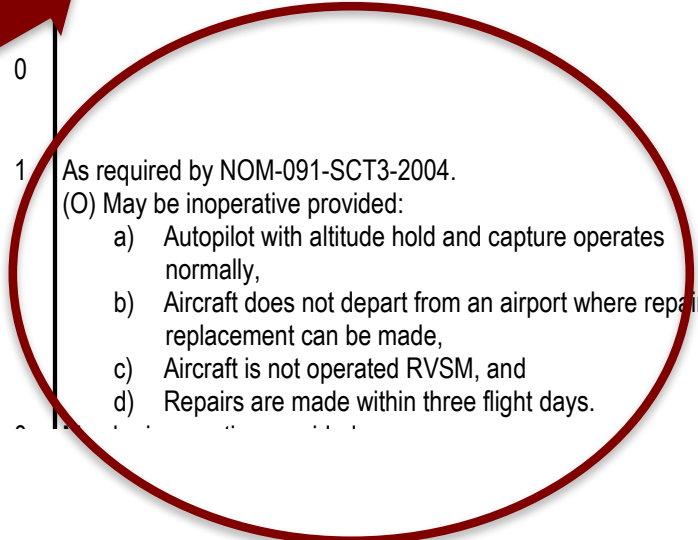
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XA-AVX

CESSNA 525B

SERIAL NUMBER 525B-0192

1. SYSTEM SEQUENCE NUMBERS & ITEMS				2. NUMBER INSTALLED
34 NAVIGATION				3. NUMBER REQUIRED FOR DISPATCH
-12-01 Air Temperature Gauge / Indication (SAT)	C	1	0	4. REMARKS OR EXCEPTIONS
-16-01 Altitude Alerting System		1	1	As required by NOM-091-SCT3-2004. (O) May be inoperative provided: a) Autopilot with altitude hold and capture operates normally, b) Aircraft does not depart from an airport where repair or replacement can be made, c) Aircraft is not operated RVSM, and d) Repairs are made within three flight days.



“Reserved” and “If Installed”



- “Reserved”:
 - These items are listed in the MEL for management purposes. “Reserved” indicates that the system is not installed on the aircraft to which the page sequence applies.
- “If Installed”:
 - Indicates that all aircraft may not have this item, because it is not required to be installed
 - If an MEL “(If installed)” item is inoperative, the Operator may not physically remove it from the aircraft for dispatch purposes.

“Reserved” and “If Installed”



Asterisk (*) symbols, the operational (o) procedures and the maintenance (m) procedures are all part of the dispatch conditions and must be performed and satisfied for dispatch of the aircraft under MMEL/MEL

Types of Maintenance procedures



- The Deactivation Procedure:
 - Deactivate and secure a system in a recommended position, before dispatching the aircraft. This procedure must be performed only one time, and before the first flight under an MEL item
- The Test/check Procedure
 - Verify the integrity of the remaining system. Either this procedure must be performed only one time, and before the first flight under an MEL item, or it must be performed each time it is required by the MEL dispatch condition.

Final Decision to Dispatch an Aircraft



- The PIC shall decide whether or not to accept an aeroplane with unserviceabilities allowed by the CDL or MEL.

- To make his decision, the Captain should take into account the:
 - Type of flight or flight time
 - Crew workload
 - Limitations
 - Departure and destination airport
 - Maximum altitude
 - Weather conditions
 - Crewmembers sensitivity.

Placards



- All inoperative elements, must be placard.
- The placard must be auto adhesive and contain two parts.
 - The first part must have the defect description and the control #, it must be included in the logbook for further reference.
 - The second part must be placed on the affected component.



Deferred Components



- It is responsibility of the operator:
 - To establish procedures for the flight and maintenance department, so they periodically review the deferred components.
 - Avoid the accumulation to prevent any conflict between each other and decrease the present workload for the crew.
 - Ensure that inoperative items are repaired as soon as possible.



Pilot Responsibility



- The PIC is directly responsible for the operation of the aircraft and is the final authority for continued operations.
- It's he that ultimately must insure that inoperative equipment is less than or equal to, but not more than what is allowed for, in the MEL.

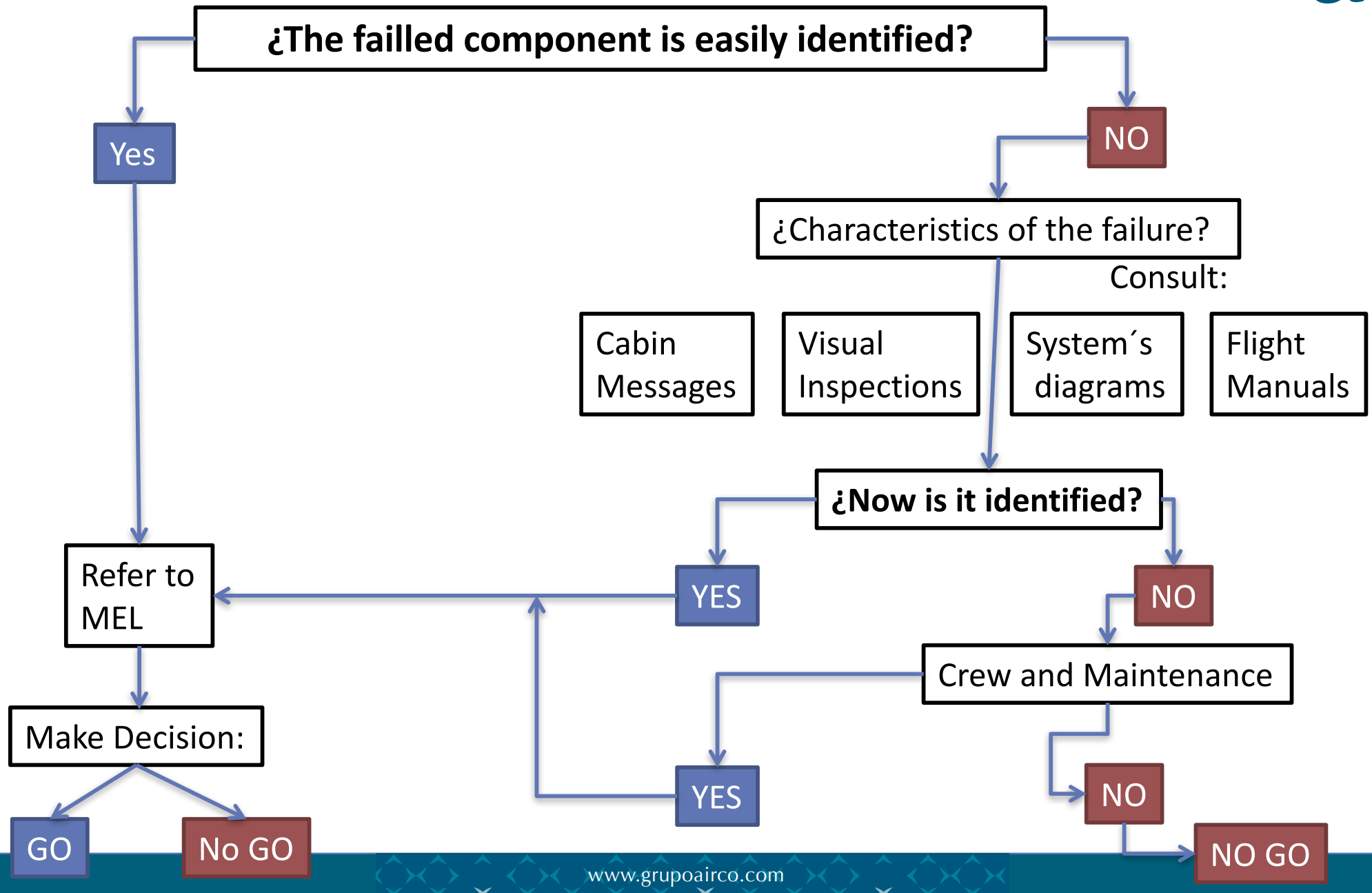


Configuration Deviation List (CDL)



- (CDL) is a reference document that enables the aircraft to be dispatched, even if some secondary airframes, or engine, parts are missing.
- These parts may be detected during maintenance checks, or pre-flight exterior inspections.
- The CDL is included in the Flight Manual (Chapter 6 – Appendices and Supplements), and is approved by Airworthiness Authorities.
- Any item that is not in the CDL must be considered necessary for the flight.

Decision Making: Flight Crew



Start

Failure of an equipment/system/function/instrument with a Flight Deck Effect* (FDE) and with an impact on safety

*Flight Deck Effect: any event that may be identified by the flight crew in the Flight Deck.



Analysis of the consequences of the failure

¿Are the consequences of the failure no more than Minor?

YES

Analysis of the consequences of the next most critical failure during the flight

¿Is the level of safety maintained?

YES

Analysis of the potential operational and/or degraded maintenance impacts (flight crew workload, human factors, ETOPS, regulations, etc)

¿Are the impacts acceptable?

YES

The item can be included in the MMEL

Creation of an (o) and/or (m)

YES

¿Can the consequences be alleviated by an (o) and/or (m)?

NO

Dispatch is NOT allowed

NO

¿Can the impact be alleviated by an (o) and/or (m)?

YES

NO

Dispatch is NOT allowed

NO

Example



- a) Consider a MMEL proposal requesting that an aircraft be permitted to dispatch with the differential pressure indicator on the cockpit pressurization control panel inoperative
- b) The standards specified for the design and operation of the aircraft type requires that pressurized cabins must have instruments at the pilot or flight engineer station to show the pressure differential between the cabin air pressure and atmospheric pressure
- c) In order to meet the criteria, the MMEL proposal would have to stipulate that the following conditions be met:
 - 1. the cabin altimeter must be operative; and
 - 2. a chart showing the relationship between the aircraft and cabin altitude for the normal operating pressure differential (e.g. 8 PSI) must be available to the crew in flight

Example



- d) Consequently, the flight crew, with reference to the aircraft's altimeter, the cabin altimeter and the specified chart, would be able to determine that the appropriate cabin pressure differential was being maintained during flight
- e) Providing that dispatching with the cabin pressure differential indicator inoperative did not seriously impact crew workload and/or efficiency and was acceptable in terms of further failures, this MMEL item would be acceptable
- f) The continued reliability of an aircraft system and the probability of total system failure, following the dispatch of an aircraft with inoperative equipment, must be considered for some MMEL items

Conclusions



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- Include in the briefing: “¿any MEL or CDL (configuration deviation list)?”, before every flight.



¡Muchas gracias!

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