GUIDANCE MATERIAL FOR
Standard Operating Procedures (SOP)

Approved by

.....

(Chula Sukmanop)
Acting Director General
The Civil Aviation Authority of Thailand

Date : 19 September 2016
Revision No: 1

ISSUE APPROVAL

This Guidance Material (GM) contains the standards, policies, procedures and guidelines concerning the Thai Air Operator Requirement (AOCR) and is published for use by The Civil Aviation Authority of Thailand (CAAT) personnel delegated with the responsibility of certifying Air Operators shall comply with all provisions in this GM during the certification process

In addition, this GM contains instruction in respect of certification to be eligible to conduct by Air Operators for guidance to reach the CAAT requirement.

Amendments to this GM will be notified through www.caat.or.th.

TABLE OF CONTENTS

LIST OF EFFECTIVE PAGES

Title	Page	Rev.	Date
Table of Contents	A/1	Original	19 September 2016
List of Effective Pages	A/2	Original	19 September 2016
Records of Revision	A/3	Original	19 September 2016
Revision Highlights	A/4	Original	19 September 2016
Chapter 1	1-7	Original	19 September 2016
Chapter 2	8-11	Original	19 September 2016
Chapter 3	12-16	Original	19 September 2016
Note on Appendices	17	Original	19 September 2016
Appendix A	18-23	Original	19 September 2016
Appendix B	24-27	Original	19 September 2016
Appendix C	28	Original	19 September 2016
Appendix D	29	Original	19 September 2016

RECORDS OF REVISION

Revision No.	Issue Date	Date Inserted	Inserted by
Original	31 August 2015	31 August 2015	DCA
1	19 September 2016	19 September 2016	OPS

REVISION HIGHLIGHTS

Revision No:	1	**Date:**	19 September 2016

Chapter/Section	**Description of Change**
All	New issue
All	Change name from DCA to CAAT

CHAPTER 1

STANDARD OPERATING PROCEDURES (SOP)

1.1 PURPOSE

1.1.1 Standard operating procedures (SOPs) are universally recognized as basic to safe aviation operations. Effective crew coordination and crew performance, two central concepts of crew resource management (CRM), depend upon the crew's having a shared mental model of each task. That mental model, in turn, is founded on SOPs. This Guidance Material (GM) presents background, basic concepts, and philosophy in respect to SOPs. It emphasizes that SOPs should be clear, comprehensive, and readily available in the manuals used by flight deck crewmembers.

1.1.2 This GM is designed to provide advice and recommendations about the development, implementation, and updating of SOPs. Appendix 1, Standard Operating Procedures Template, provides many important topics that should be addressed in SOPs. Stabilized Approach, characterized by a constant-angle, constant-rate of descent ending near the touchdown point where the landing maneuver begins, is among the SOPs specifically identified in this GM and is described in Appendix 2, Stabilized Approach: Concepts and Terms. These and the other appendices represent a baseline and a starting point. Start-up certificate holders and existing certificate holders should refer to the Template in Appendix 1, to Stabilized Approach in Appendix 2, and to the other appendices in developing comprehensive SOPs for use in training programs and in manuals used by their flight crew members

1.2 SCOPE

1.2.1 Appendix 1 consolidates many topics viewed by operators and by CAAT as important, to be addressed as SOPs in air operator training programs and in the manuals used by air operator flight deck crew members.

1.2.2 This AC does not list every important SOP topic or dictate exactly how each topic should be addressed by an AOC holder. Instead, this AC offers a baseline of topics, to be used as a reference. In practice, each AOC holder's manuals and training programs are unique. Each AOC holder could omit certain topics shown in the template when they do not apply, and, on the other hand, could add other topics not shown in the template when they do apply.

1.2.3 This GM contains guidance intended for use primarily by Air Operator Certificate holders authorized to conduct operations in accordance with Thai Air Navigation ACT 2497.

1.3 RELATED REGUL ATIONS. 14 CFR part 121, sections 121.133, 121.141, 121.401; 14 CFR part 125, section 125.287; 14 CFR part 135, section 135.293.

1.4 RELATED PUBLICATIONS

1.4.1 AC 120-71A Standard Operating Procedure For Flight Deck Crewmembers

1.4.2 International Civil Organization (ICAO) Document 8168 Part 3 Section 5 Standard Operating Procedure and Checklist

1.5 BACKGROUND

For many years the International Civil Aviation Organization (ICAO) has identified deficiencies in standard operating procedures as contributing causal factors in aviation accidents. Among the most commonly cited deficiencies involving flight crews has been their non-compliance with established procedures, another has been the nonexistence of established procedures in some manuals used by flight crews.

The ICAO has recognized the importance of SOPs for safe flight operations. Recent amendments to ICAO Annex 6 and PANS OPS Document 8168, Vol. 1, establish that each Members State shall require that SOP's for each phase of flight be contained in the operations manual used by pilots.

Many Aviation Safety Organizations have concluded that Air Operators perform with higher levels of safety when they establish and adhere to adequate SOPs.

A study of CFIT accidents found almost 50 percent of the 107 CFIT interventions identified by an analysis team related to the flight crew's failure to adhere to SOPs or the AOC holder's failure to establish adequate SOP's.

1.6 APPLYING THE SOPs TEMPLATE AND OTHER APPENDICES.

Generally, each SOP topic identified in the template (following as Appendix 1) is important; the certificate holder should address them in some manner, if applicable. Stabilized Approach (Appendix 2) is a particularly important SOP. Other important SOPs, such as those associated with special operating authority or with new technology, are not shown in the template, but should be addressed as well, when applicable. Because each certificate holder's operation is unique, the certificate holder should develop the specific manner in which SOPs are addressed. Topics expanded and illustrated in the Appendices are for example only, and represent renditions of SOPs known to be effective. **No requirement is implied or intended to change existing SOPs based solely on these examples.** An SOP topic shown

in the Appendices may be addressed in detail, including text and diagrams, or in very simple terms.

CAAT strongly advises all operators of aircraft to develop and use standard operating procedures and checklists for the operation of their aircraft.

All Thailand AOC holders that operate multi-crew aircraft must have standard operating procedures approved by the CAAT in order to operate these aircraft in commercial air transport.

1.7 KEY FEATURES OF EFFECTIVE SOPs.

Many experts agree that implementation of any procedure as an SOP is most effective if: The procedure is appropriate to the situation.

The procedure is practical to use.

Crew members understand the reasons for the procedure.

Pilot Flying (PF), Pilot Monitor (PM), and Flight Engineer duties are clearly delineated.

Effective training is conducted.

The attitudes shown by instructors, check pilots, and managers all reinforce the needs for the procedure.

If all elements (above) are not consistently implemented, flight crews too easily become participants in an undesirable double standard condoned by instructors, check pilots, and managers. Flight crews may end up doing things one way to satisfy training requirements and check rides, but doing them another way in " real life " during line operations. When a double standard does appear in this way, it should be considered a red flag that a published SOP may not be practical or effective for some reason. That SOP should be reviewed and perhaps changed

1.8 COLLABORATING FOR EFFECTIVE SOPs.

In general, effective SOPs are the product of healthy collaboration among managers and flight operations people, including flight crews. A safety culture promoting continuous feedback from flight crews and others, and continuous revision by the collaborators distinguishes effective SOPs at air operators of all sizes and ages.

New operators, operators adding a new aircraft fleet, or operators retiring one aircraft fleet for another must be especially diligent in developing SOPs. Collaborators with applicable experience may be more difficult to bring together in those instances.

For a startup AOC holder, this GM and its Appendices should be especially valuable tools in developing SOPs. The developers should pay close attention to the approved Airplane Flight Manual (AFM), to AFM revisions and operations bulletins issued by the manufacturer. Desirable partners in the collaboration would certainly include representatives of the airplane manufacturer, pilots having previous experience with the airplane or with the kind of operations planned by the operator, and representatives from the authority, including the principal operations inspector (POI) and members of the Management Team. It is especially important for a new operator to maintain a periodic review process that includes line flight crews. Together, managers and flight crews are able to review the effectiveness of SOPs and to reach valid conclusion for revisions. The review process will be meaningful and effective when managers promote prompt implementation of revisions to SOPs when necessary.

An existing AOC holder introducing a new airplane fleet should also collaborate using the best resources available, including the AFM and operations bulletins. Experience has shown that representatives of the airplane manufacturer, managers, check pilot, instructors, and line pilots work well together as a team develop effective SOPs. A trial period might be implemented, followed by feedback and revision, in which SOPs are improved. By being part of an iterative process for changes in SOPs, the end

user, the flight crew member, is generally inclined to accept the validity of changes and to implement them readily

Long-established operators should be careful not to assume too readily that they can operate an airplane recently added to the fleet in the same, standard way as older types or models. Managers, check pilot, and instructors should collaborate using the best resources available, including the AFM and operations bulletins to ensure that SOPs developed or adapted for a new airplane are in fact effective for that aircraft, and are not inappropriate carryovers.

Safety in commercial aviation continues to depend on good crew performance. Good crew performance, in turn, is founded on standard operating procedures that are clear, comprehensive, and readily available to the flight crew. This AIC provides an SOPs template and many other useful reference in developing SOPs. Development of SOPs is most effective when done by collaboration, using the best resources available in including the end users themselves, the flight crews. Once developed, effective SOPs should be continually reviewed and renewed.

members of the Management Team. It is especially important for a new operator to maintain a periodic review process that includes line flight crews. Together, managers and flight crews are able to review the effectiveness of SOPs and to reach valid conclusion for revisions. The review process will be meaningful and effective when managers promote prompt implementation of revisions to SOPs when necessary.

An existing AOC holder introducing a new airplane fleet should also collaborate using the best resources available, including the AFM and operations bulletins. Experience has shown that representatives of the airplane manufacturer, managers, check pilot, instructors, and line pilots work well together as a team develop effective SOPs. A trial period might be implemented, followed by feedback and revision, in which SOPs are improved. By being part of an iterative process for changes in SOPs, the end user, the flight crew member, is generally inclined to accept the validity of changes and to implement them readily

Long-established operators should be careful not to assume too readily that they can operate an airplane recently added to the fleet in the same, standard way as older types or models. Managers, check pilot, and instructors should collaborate using the best resources available, including the AFM and operations bulletins to ensure that SOPs developed or adapted for a new airplane are in fact effective for that aircraft, and are not inappropriate carryovers.

Safety in commercial aviation continues to depend on good crew performance. Good crew performance, in turn, is founded on standard operating procedures that are clear, comprehensive, and readily available to the flight crew. This AIC provides an SOPs template and many other useful reference in developing SOPs. Development of SOPs is most effective when done by collaboration, using the best resources available in including the end users themselves, the flight crews. Once developed, effective SOPs should be continually reviewed and renewed.

CHAPTER 2 CHECKLISTS

2.1 GENERAL

Operators shall establish checklists as an integral part of standard operating procedures (SOPs). Checklists should describe the actions relevant to specific phases of operations (engine start, taxi, take-off, etc.) that flight crews must perform or verify and which relate to flight safety. Checklists should also provide a framework for verifying aircraft and systems configuration that guards against vulnerabilities in human performance.

2.2 CHECKLIST OBJECTIVES

2.2.1 Normal checklists should aid flight crews in the process of configuring the aircraft and its systems by:

a) providing logical sequences of coverage of the flight deck panels;

b) providing logical sequences of actions to meet both internal and external flight deck operational requirements;

c) allowing mutual monitoring among flight crew members to keep all flight crew members in the information loop; and

d) facilitating crew coordination to assure a logical distribution of flight deck tasks.

2.2.2 Checklists for use in abnormal situations and those for emergency situations should aid flight crews in coping with malfunctions of aircraft systems and/or emergency situations. They should also guard against vulnerabilities in human performance during high workload situations by fulfilling the objectives in 2.2.1 and, in addition, by:

a) ensuring a clear allocation of duties to be performed by each flight crew member;

b) acting as a guide to flight crews for diagnosis, decision making and problem solving, (prescribing sequences of steps and/or actions); and

c) ensuring that critical actions are taken in a timely and sequential manner.

2.3 CHECKLIST DESIGN

2.3.1 Order of checklist items

2.3.1.1 The following factors should be considered when deciding the order of the items in checklists:

a) the operational sequence of aircraft systems so that items are sequenced in the order of the steps for activation and operation of these systems;

b) the physical flight deck location of items so that they are sequenced following a flow pattern;

c) the operational environment so that the sequence of checklists considers the duties of other operational personnel such as cabin crew and flight operations officers;

d) operator policies (for example, resource conservation policies such as single-engine taxi) that may impinge on the operational logic of checklists;

e) verification and duplication of critical configuration-related items so that they are checked in the normal sequence and again immediately before the phase of flight for which they are critical; and

f) sequencing of critical items in abnormal and emergency checklists so that items most critical are completed first.

2.3.1.2 Critical items should appear no more than twice on a given checklist (see 2.3.1.1 e)). Critical items should be verified by more than one flight crew member.

2.3.2 Number of checklist items

The number of items in checklists should be restricted to those critical to flight safety.

Note.— The introduction of advanced technology in the flight deck, allowing for automated monitoring of flight status, may justify a reduction in the number of items required in checklists.

2.3.3 Checklist interruptions

SOPs should include techniques to ensure a step-by-step, uninterrupted sequence of completing checklists. SOPs should unambiguously indicate the actions by flight crews in case of checklist interruptions.

2.3.4 Checklist ambiguity

Checklist responses should portray the actual status or the value of the item (switches, levers, lights, quantities, etc.).

Checklists should avoid non-specific responses such as “set”, “checked” or “completed”.

2.3.5 Checklist coupling

Checklists should be coupled to specific phases of flight (engine start, taxi, take-off, etc.). SOPs should avoid tight coupling of checklists with the critical part of a phase of flight (for example, completing the take-off checklist on the active runway). SOPs should dictate a use of checklists that allows buffers for detection and recovery from incorrect configurations.

2.3.6 Typography

2.3.6.1 Checklist layout and graphical design should observe basic principles of typography, including at least legibility of print (discriminability) and readability under all flight deck lighting conditions.

2.3.6.2 If colour coding is used, standard industry colour coding should be observed in checklist graphical design.

Normal checklists should be identified by green headings, system malfunctions by yellow headings, and emergency checklists by red headings.

2.3.6.3 Colour coding should not be the only means of identifying normal, abnormal and emergency checklists.

CHAPTER 3 CREW BRIEFINGS

3.1 GENERAL

3.1.1 Operators shall establish crew briefings as an integral part of standard operating procedures (SOPs). Crew briefings communicate duties, standardize activities, ensure that a plan of action is shared by crew members and enhance crew situational awareness.

3.1.2 Operators shall establish both individual and combined crew briefings for flight crew and cabin crew.

Note.— The Preparation of an Operations Manual *(Doc 9376), Chapter 8, 8.6.8, includes general considerations about briefings.*

3.2 OBJECTIVES

Crew briefings should aid crews in performing safety-critical actions relevant to specific phases of flight by:

a) refreshing prior knowledge to make it more readily accessible in real-time during flight;

b) constructing a shared mental picture of the situation to support situational awareness;

c) building a plan of action and transmitting it to crew members to promote effective error detection and management; and

d) preparing crew members for responses to foreseeable hazards to enable prompt and effective reaction.

Note.— Without briefings, and under the pressure of time constraints and stress, retrieving information from memory may be an extremely unreliable process.

3.3 PRINCIPLES

3.3.1 The following principles should be considered when establishing crew briefings:

a) crew briefings should be short and should not include more than ten items. If more than ten items are necessary, consideration should be given to splitting the briefing into sequential phases of the flight;

b) crew briefings should be simple and succinct, yet sufficiently comprehensive to promote understanding of the plan of action among all crew members;

c) crew briefings should be interactive and where possible should use a question-and-answer format;

d) crew briefings should be scheduled so as not to interfere with, and to provide adequate time for, the performance of operational tasks; and

e) crew briefings should achieve a balance between effectiveness and continual repetition of recurring items.

Note.— Crew briefings that become routine recitations do not refresh prior knowledge and are ineffective.

3.3.2 Any intended deviation from SOPs required by operational circumstances should be included as a specific briefing item.

3.4 APPLICATION

3.4.1 Operators shall implement flight and cabin crew briefings for specific phases of operations to include actual conditions and circumstances, as well as special aspects of operations.

3.4.2 Flight crew briefings shall be conducted for, but not be limited to, the following phases of operations:

a) pre-flight;

b) departure; and
c) arrival.

3.4.3 Cabin crew briefings shall be conducted for, but not be limited to, the following phases of operations:

a) pre-flight; and
b) first departure of the day.

3.4.4 Cabin crew briefings should be conducted following changes of aircraft type or crew and before flights involving a stop of more than two hours.

3.5 SCOPE

3.5.1 Pre-flight briefings shall include both flight crew and cabin crew.

3.5.2 Pre-flight briefings should focus on crew coordination as well as aircraft operational issues. They should include, but not be limited to:

a) any information necessary for the flight, including unserviceable equipment or abnormalities that may affect operational or passenger safety requirements;
b) essential communications, and emergency and safety procedures; and
c) weather conditions.

3.5.3 Flight crew departure briefings should prioritize all relevant conditions that exist for the take-off and climb.
They should include, but not be limited to:

a) runway in use, aircraft configuration and take-off speeds;
b) taxi-out route and relevant hot spots;
c) departure procedures;
d) departure routes;

e) navigation and communications equipment set-up;

f) aerodrome, terrain and performance restrictions, including noise abatement procedures (if applicable);

g) take-off alternates (if applicable);

h) any item(s) included in the minimum equipment list (if applicable);

i) review of applicable emergency procedures; and

j) applicable standard call-outs.

Note.— The Preparation of an Operations Manual *(Doc 9376), Chapter 8, 8.6.9, includes general considerations about standard call-outs. Attachment F to Chapter 8 contains an example of an operator's guidance on standard call-out procedures.*

3.5.4 Flight crew arrival briefings should prioritize all relevant conditions that exist for the descent, approach and landing. They should include, but not be limited to:

a) terrain restrictions and minimum safe altitudes during descent;

b) arrival routes;

c) instrument or visual approach procedures and runway in use;

d) operational minima, aircraft configuration, and landing speeds;

e) navigation and communications equipment set-up;

f) taxi-in route and relevant hot spots;

g) missed approach procedures;

h) alternate aerodromes and fuel considerations;

i) review of applicable emergency procedures;

j) applicable standard call-outs; and

Note.— The Preparation of an Operations Manual *(Doc 9376), Chapter 8, 8.6.9, includes general considerations about standard call-*

outs. Attachment F to Chapter 8 contains an example of an operator's guidance on standard call-out procedures.

k) cold temperature correction (see Section 1, Chapter 4, 4.3).

3.5.5 Cabin crew briefings should prioritize all relevant conditions that exist for the departure. They should include, but not be limited to:

a) assignment of take-off/landing positions;

b) review of emergency equipment;

c) passengers requiring special attention;

d) the silent review process;

Note.— The silent review process is the self-review of individual actions in the event of emergencies.

e) review of applicable emergencies;

f) security or service-related topics that may impact on passenger or crew safety; and

g) any additional information provided by the operator, including review of new procedures, equipment and systems.

NOTE ON APPENDICES

The following appendices contain examples of Standard Operating Procedures (SOPs) that are identical to or similar to some SOPs currently is use. Those examples do not represent a rigid DCA view of best practices, which may vary among fleets and among and AOC holders, and may change over time.

Some of the examples may be readily adapted to a AOC holder's flight crew training and operating manuals for various airplane fleets. Others may apply to a certain airplane fleet and may not be adaptable apart from that fleet.

In some cases a term shown in an Appendix is a term used by a AOC holder, not the equivalent term used by the authority. Where the authority would use the term "height above touchdown," or HAT, the example shows that the AOC holder has used the term "above field elevation," or AFE.

APPENDIX A
STANDARD OPERATING PROCEDURES TEMPLATE

A manual or section in a manual serving as the flight crew's guide to standard operating procedures (SOPs) may double as a training guide. The content should be clear and comprehensive, without necessarily being lengthy. No template could include every topic that might apply unless it were constantly revised. Many topics involving special operating authority or new technology are absent from this template, among them EDTO, PRM, SMGS, RNP, and many others.

The following are nevertheless viewed by industry and FAA alike as examples of topics that constitute a useful template for developing comprehensive, effective SOPs:

- Captain's authority
- Use of automation

The operator's automation philosophy
Specific guidance in selection of appropriate levels of automation
Autopilot/flight director mode control inputs
Flight management systems inputs
Monitoring of automated systems and Flight Mode Annunciator (FMA)
Cross checking of FMS routing with ATC clearance during preflight

- Checklist philosophy
  - Policies and procedures
  - (Who calls for; who reads; who does) Format and terminology
  - Type of checklist
  - Challenge-Do-Verify Do-Verify
  - Walk-arounds
- Checklists
  - Safety check-power on Originating/receiving Before start

- After start Before taxi Before take-off After take-off Climb check Cruise check
- Preliminary landing Landing
- After landing Parking and securing
- Emergency procedures
- Non-normal/abnormal procedures

- Communications
  - Who handles radio Primary language used ATC
  - On the flight deck Keeping both pilots in the loop Company radio procedures Flight deck/cabin signals Cabin/flight deck signals
- Briefings

- CFIT risk considered
- Special airport qualification considered Temperature corrections considered Before takeoff Descent/approach/missed approach
- Approach briefing generally done prior to beginning of descent
- Flight deck access
- On ground/in flight Jump seat
- Access signals, keys
- Flight deck discipline
- PF/PM duties and responsibilities Sterile cockpit
- Maintaining outside vigilance Monitoring/cross-checking
- Transfer of control
- Additional duties Flight kits Headsets/speakers Boom mikes/handsets Maps/approach charts Meals
- Altitude awareness
- Altimeter settings Transition level
- Callouts (verification of) Minimum safe altitudes (MSA) Temperature corrections
- Monitoring during last 1000 feet of altitude change
- Report times

- Check in/show up On flight deck
- Checklist accomplishment
  - Maintenance procedures
- Logbooks/previous write-ups Open write-ups
- Notification to maintenance of write-ups Minimum equipment list (MEL)
- Where it is accessible Configuration Deviation List (CDL)
- Crew coordination in ground de-icing
  - Flight plans/dispatch procedures/takeoff and landing calculations VFR/IFR
    - Icing considerations Fuel loads
    - Weather package
    - Where weather package is available Departure procedure climb gradient analysis
  - Boarding passengers/cargo
    - Carry-on baggage Exit row seating Hazardous materials
    - Prisoners/escorted persons Guns onboard
    - Count/load
  - Pushback/power back
  - Taxiing
    - Single engine All engines
    - On ice or snow
    - Prevention of runway incursion
  - Crew Resource Management (CRM) Crew briefings
    - Flight Crew Flight Attendants
  - Weight & balance/cargo loading
    - Who is responsible for loading cargo, and securing cargo Who prepares the weight & balance data form; who checks it
    - Copy to crew
  - Flight deck/cabin crew interchange Boarding
    - Ready to taxi Cabin emergency

  - Prior to take-off/landing
- Take-off
  - Who conducts it Briefing, IFR/VFR
  - Reduced power procedures Tailwind, runway clutter
  - Intersections/land and hold short procedures (LAHSO) Noise abatement procedures
  - Special departure procedures Flight directors
  - Use of: Yes/No Callouts
  - Clean up
  - Loss of engine Reject takeoff After V1 Actions/callouts Flap settings Normal
  - Nonstandard and reason for Crosswind Close-in turns
- Climb
- Speeds Configuration
  - Confirm compliance with climb gradient required in departure procedure
  - Confirm appropriate cold temperature corrections made
- Cruise altitude selection
- Speeds/weights
- Position reports/pilot weather reports (PIREPs)
  - ATC – including PIREPs of hazards such as icing, thunderstorms, and turbulence
  - Company
- Emergency descents
- Holding procedures
- Procedures for diversion to alternate
- Normal descents
  - Planning beginning of descent point
  - Risk assessment and briefing (see example, paragraph 4.b in this AC) Speed brakes: Yes/No
  - Flaps/gear use
  - Icing considerations Convective activity

- Ground proximity warning system (GPWS or TAWs) Escape maneuver
- TCAS
- Winds shear
  - Avoidance of likely encounters Recognition
  - Recovery / escape maneuver
- Approach philosophy
  - Monitoring during approach Precision approaches preferred
  - Coordinate with ATC and plan ahead to avoid rushed approaches Stabilized approaches standard
  - Use of navigation aids
  - Flight management system (FMS)/autopilot Use, and when to discontinue use
  - Approach gates
  - Limits for stabilized approaches Use of radio altimeter
  - Go-arounds: Plan to go around on every approach; change plan to land when visual, or when conditions permit in low-visibility operations – only if stabilized
- Individual approach type
  - All types, including engine-out
- For each type of approach
  - Profile
  - Airplane configuration for conditions Visual approach
  - Low visibility Contaminated runway
  - Flap/gear extension
  - Auto spoiler and auto brake systems armed and confirmed armed by both pilots, in accordance with manufacturer's recommended procedures (or equivalent approved company procedures)
  - Actions and callouts
- Go-around / missed approach
  - When stabilized approach gates are missed Actions and

callouts (see example, Appendix 4) Clean-up profile

- Landing
  - Actions and callouts during landing Close-in turns
  - Crosswind Rejected
  - Actions and callouts during rollout (see example, Appendix 18) "No Spoilers" callout
  - Reverse thrust "Overshoot" callout Transfer of control after first officer landing

APPENDIX B
STABILIZED APPROACH: CONCEPTS AND TERMS

A **stabilized approach** is one of the key features of safe approaches and landings in air carrier operations, especially those involving transport category airplanes.

A stabilized approach is characterized by a **constant-angle, constant-rate of descent** approach profile ending near the touchdown point, where the landing maneuver begins. A stabilized approach is the safest profile in all but special cases, in which another profile may be required by unusual conditions.

All appropriate **briefings and checklists** should be accomplished before 1000' height above touchdown (HAT) in instrument meteorological conditions (IMC), and before 500' HAT in visual meteorological conditions (VMC)

Flight should be **stabilized by 1000'** HAT in IMC, and by 500' HAT in VMC.

An approach is stabilized when all of the following **criteria** are maintained from 1000 HAT (or 500 HAT in VMC) to landing in the touchdown zone

The airplane is on the **correct1 track**.

The airplane is in the proper landing configuration.

After glide path intercept, or after the final approach fix (FAF), or after the derived fly-off point (per Jeppesen) the pilot flying requires no more than normal **bracketing corrections2** to maintain the correct track and desired profile (3° descent angle, nominal) to landing within the touchdown zone. Level-off below 1000' HAT is not recommended.

The airplane speed is within the acceptable range specified in the approved operating manual used by the pilot.

The rate of descent is no greater than 1000 feet per minute (fpm).

- If an expected rate of descent greater than 1000 fpm is planned, a special approach briefing should be performed.
- If an unexpected, sustained rate of descent greater than 1000 fpm is encountered during the approach, a missed approach should be performed. A second approach may be attempted after a special approach briefing, if conditions permit.

Power setting is appropriate for the landing configuration selected, and is within the permissible power range for approach specified in the approved operating manual used by the pilot.

When no vertical guidance is provided: Vertical guidance may be provided to the pilot by way of an electronic glideslope, a computed descent path displayed on the pilot's navigation display, or other electronic means. On approaches for which no vertical guidance is provided, the flightcrew should plan, execute, and monitor the approach with special care, taking into account traffic and wind conditions. To assure vertical clearance and situation awareness, the pilot not flying should announce crossing altitudes as published fixes and other points selected by the flightcrew are passed. The pilot flying should promptly adjust descent angle as appropriate. A constant-angle, constant-rate descent profile ending at the touchdown point is the safest profile in all but special cases.

Visual contact. Upon establishing visual contact with the runway or appropriate runway lights or markings, the pilot should be able to continue to a safe landing using normal bracketing corrections, or, if unable, should perform a missed approach.

No visual contact. The operator may develop procedures involving an approved, standard MDA buffer altitude or other approved procedures to assure that descent below MDA does not occur during the missed approach. If no visual contact is established approaching MDA or an approved MDA buffer altitude, or if the missed approach point is reached, the pilot should perform the published missed approach procedure. Below1000' HAT, leveling off at MDA (or at some height above MDA) is not recommended, and a missed approach should be performed.

Note 1 : A **correct track** is one in which the correct localizer, radial, or other track guidance has been set, tuned, and identified, and is being followed by the pilot.

Criteria for following the correct track are **discussed in FAA Advisory Circulars** relating to Category II and Category III approaches. Criteria for following track in operations apart for Category II and Category III are under development.

Note 2 : Normal bracketing corrections relate to bank angle, rate of descent, and power management. Recommended ranges are as follows (operating limitations in the approved airplane flight manual must be observed, and may be more restrictive):

Bank angle Maximum bank angle permissible during approach is specified in the approved operating manual used by the pilot, and is generally not more than 30°; the maximum bank angle permissible during landing may be considerably less than 30°, as specified in that manual.

Rate of descent ± 300 fpm deviation from target

Power management Permissible power range is specified in the approved operating manual used by the pilot

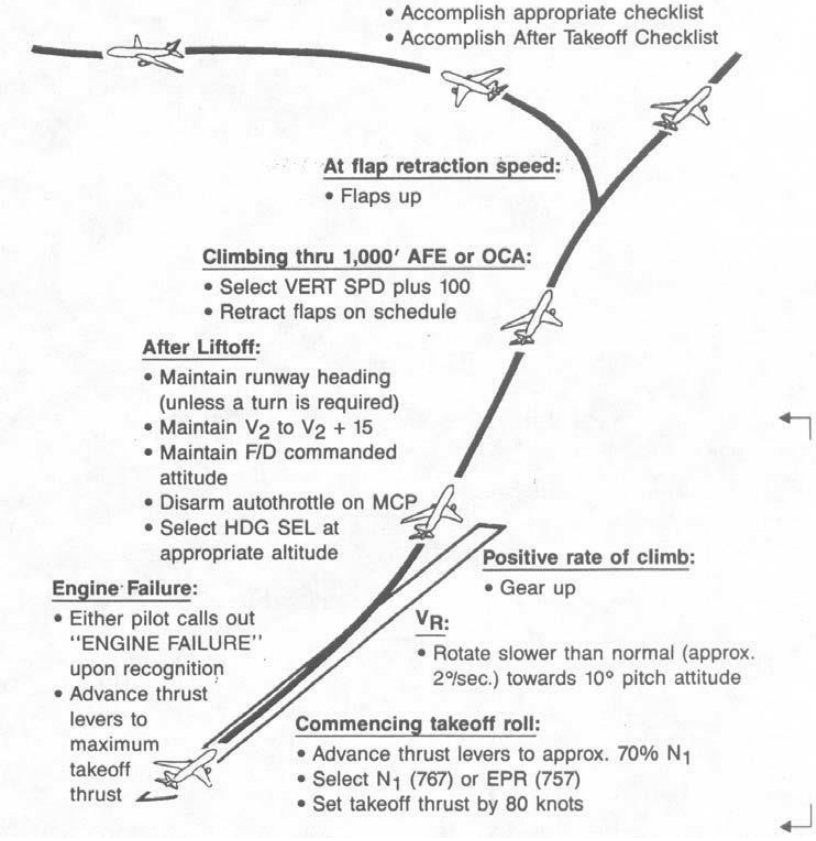
Overshoots Normal bracketing corrections occasionally involve momentary overshoots made necessary by atmospheric conditions. Such overshoots are acceptable. Frequent or sustained overshoots caused by poor pilot technique are not normal bracketing corrections.

APPENDIX C
ENGINE FAILURE AT or ABOVE V1 – PROFILE (example)

ENGINE FAILURE AT OR ABOVE V_1 PROFILE

FLAP/SPEED SCHEDULE				
	Flap Setting for Takeoff			
	20	15	5	1
Select flaps 5 at	V_{REF} + 20	V_{REF} + 20		
Select flaps 1 at	V_{REF} + 40	V_{REF} + 40	V_{REF} + 40	
Select flaps 0 at	V_{REF} + 60	V_{REF} + 60	V_{REF} + 60	V_{REF} + 60
Final Segment Climb	V_{REF} + 80			

NOTE: After takeoff (and accelerating), the next lower flap setting may be made 20 knots prior to the maneuver speed for the flap settings as shown in the table above. In the event of a turn during flap retraction, limit bank angle to 15° or delay flap retraction until maneuver speed is reached.

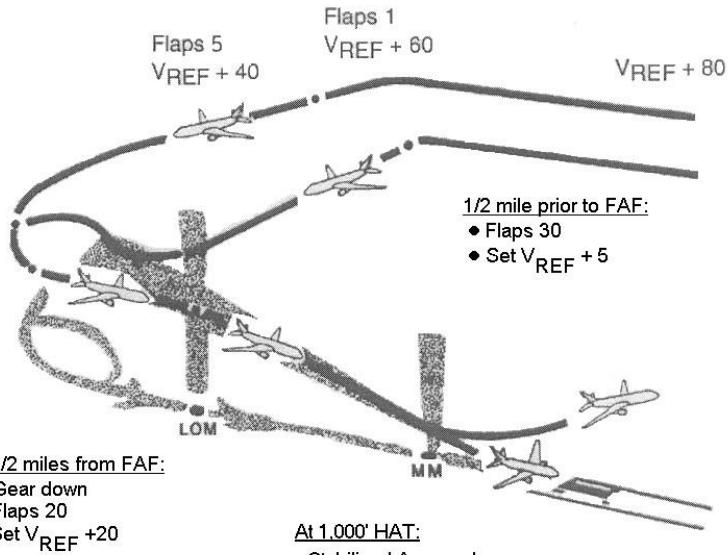


APPENDIX D
APPROACH PROFILE: LNAV, LOC, or LOC B/CRS (example)

- Complete Approach Briefing
- Complete Preliminary Landing Checklist

When cleared for the approach:

- Select LNAV, LOC, or LOC B/CRS*, as appropriate
- Verify armed
- Set raw data backup, as required



1/2 mile prior to FAF:

- Flaps 30
- Set V_{REF} + 5

2-1/2 miles from FAF:

- Gear down
- Flaps 20
- Set V_{REF} +20
- Initiate Landing Checklist

At 1,000' HAT:

- Stabilized Approach

At MDA or MDA Buffer Altitude:

- Set missed approach altitude
- If runway environment is in sight and the aircraft is in a position from which a normal approach to the intended runway can be made, land the aircraft.

- or -

- If runway environment is not in sight, perform a missed approach procedure.

* Aircraft not equipped with B/CRS feature, use LNAV