MD-10/MD-11
FLIGHT STANDARDIZATION BOARD (FSB) REPORT
(Revision 1)
01/22/2009

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HIGHLIGHTS OF REVISION 1 CHANGES

The primary purpose of this revision is the addition of Appendix 5 that documents the training/checking/currency requirements for operations of Honeywell Head-up-Display (HUD) and Kollsman Enhanced Flight Vision System (EFVS).
ORIGINAL FSB COMPOSITION

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BACKGROUND

The MD-10 airplane is a major change to the DC-10 type design and is customized by Boeing Airplane Services (BAS), a division of The Boeing Company (Boeing), for a single operator, the Federal Express Corporation (FedEx). FedEx Management and Line Pilots were involved in the development and flight testing of the MD-10.

This modification applies new technology and essentially provides for MD-11 and MD-10 flightdeck commonality. This modification converts the DC-10 aircraft from three crew to two crew operation. Crew workload studies were accomplished on the MD-11 and were accomplished for the MD-10 differences. The flight controls, control systems, flap/slat handle and engines of the DC-10 remain unchanged. The MD-10 flightdeck systems replicate many of the MD-11 systems including:
- An Electronic Instrument System (EIS).
- A MD-11 type Auto Flight System.
- Automatic System Controllers (excluding the Air System).

The Long Beach Aircraft Evaluation Group (LGB-AEG) was requested by Boeing to determine training and type rating requirements using the methods outlined in Advisory Circular (AC) 120-53. A T-2 test (Handling Qualities Comparison) as outlined in AC 120-53, was conducted to evaluate the effect of the MD-11 Flight Control Computer (FCC) 908 software load in eliminating handling differences with the MD-10 during takeoff and landing phase of flight. A T-3 test was conducted to evaluate system differences and validate proposed training and checking. The only training program evaluated was receiving Initial and Transition Training and Type Rating in the MD-11 with Differences Training to the MD-10, as requested by Boeing and FedEx. Adequate training devices were not available to conduct evaluations of MD-10 Initial or Transition Training and may be evaluated at a later date.
1. PURPOSE AND APPLICABILITY

1.1 This FSB report specifies FAA master training, checking, and currency requirements applicable to crews operating MD-10 and MD-11 aircraft under FAR 121. This report also addresses certain issues regarding the operation of MD-10 and MD-11 aircraft other than under FAR 121 (e.g. Type Rating Determination, Training, etc.). Provisions of this report include:

1.1.1 Pilot "Type Rating" Requirements.

1.1.2 Describing "Master Common Requirements" (MCRs) applicable to MD-10s and MD-11s.

1.1.3 Describing "Master Difference Requirements" (MDRs) for crews requiring differences qualification for mixed-fleet flying or transition of MD-10 variants, MD-11 variants, or both MD-10 and MD-11 variants.

1.1.4 Providing examples of acceptable "Operator Difference Requirement (ODR)" Tables.

1.1.5 Describing an acceptable training program and training device characteristics when necessary to establish compliance with pertinent MDRs.

1.1.5 Setting checking and currency standards including specification of particular check items that must be administered by FAA or operators.

1.1.7 Providing information to FAA Field Offices about MD-10 and MD-11 compliance with FARs, Advisory Circular, or other operational criteria.

1.2 This report provides:

1.2.1 Minimum requirements which must be applied by FAA field offices, (e.g. MCRs, MDRs, Type Rating designations, etc.).

1.2.2 Information which is advisory in nature, but may be mandatory for particular operators if the designated configurations apply and if approved for that operator (e.g. MDR footnotes, acceptable ODR tables).

1.2.3 Information which is used to facilitate FAA review of an aircraft type or variant proposed for use by an operator (e.g. compliance checklist for FAA Field Office use etc.). Note: Various sections within this report are qualified as to whether compliance (considering the FARs and provisions of AC 120-53) is required, is recommended, or is advisory in nature.

1.3 This report addresses MD-10 variants including MD-10-10F, -30F, and MD-11 variants including the MD-11 and MD-11F. Refer to FAA Type Certificate Data Sheet A22WE.

1.4 The provisions of this report are effective until amended, superseded, or withdrawn by subsequent revisions to this FSB report.
1.5 Terminology:

The term "must" is used in this report and certain MDR footnotes even though it is recognized that this FSB report, and Advisory Circular AC 120-53 on which it is based, provides one acceptable means, but not necessarily the only means of compliance with FAR 121 Subpart N and O requirements. This terminology acknowledges the need for operators to fully comply with this FSB report MDR and ODR provisions if AC 120-53 is to be used by the operator as the means of complying with FAR 121. Operators who choose this method must comply with each applicable MDR provision including the footnotes.

1.6 Acronyms:

The following is a list of some of the acronyms used in this report:

AGL - Above Ground Level
APD - Aircrew Program Designee
APM - Aircrew Program Manager
AQP - Advanced Qualification Program
ASI - Aviation Safety Inspector
ATP - Airline Transport Pilot
CAWS - Central Aural Warning System
CBT - Computer Based Training
CWS - Control Wheel Steering
DU - Display Unit
EAD - Engine and Alert Display
FCP - Flight Control Panel
FF - Fuel Flow
FMC - Flight Management Computer
FMA - Flight Mode Annunciator
FMS - Flight Management System
FQ - Fuel Quantity
FTD - Flight Training Device
IRS - Inertial Reference System
LSAS - Longitudinal Stability Augmentation System
LOFT - Line Oriented Flight Training
MDA - Minimum Descent Altitude
ND - Navigation Display
NSP - National Simulator Program
PDCS - Performance Data Computer System
PFD - Primary Flight Display
PMS - Performance Management System
PNF - Pilot Not Flying
POI - Principal Operation Inspector
PROF - Profile Mode
RCWS - Roll Control Wheel Steering
RTO - Rejected Takeoff
SD - System Display

2. PILOT "TYPE RATING" REQUIREMENTS

In accordance with the provisions of FAR 1 and 61, the same "Type Ratings" are assigned to the MD-10 and MD-11. Any MD-10 variant is designated as a "MD-11", and any MD-11 variant is designated as a "MD-11". Initial or Transition training and Type Rating must be accomplished in the MD-11 before MD-10 difference training, as outlined in Appendix 1,2,and 3.
3. "MASTER COMMON REQUIREMENTS" (MCRs)

3.1 MINIMUM HEIGHT FOR USE OF AUTOPILOT (FAR 121.579):

3.1.1 MD-10 and MD-11:

For the MD-10 and MD-11, unless a higher value is otherwise specified by FAA (e.g. by AFM, AD, service bulletin, etc.) the minimum height for engagement of the autopilot for MD-10 and MD-11 aircraft, under FAR 121 operations, is 200 feet AGL in "takeoff", "level change", "vertical speed", and "altitude hold" mode. "PROF" Mode may be used in accordance with AFM constraints for minimum engagement altitude.

For autopilot precision approach, dual land, single land, or go-around, autopilot minimum use height is as specified by the AFM for the respective mode (i.e. autopilot may usually remain engaged through completion of landing rollout). For non-precision approach, the autopilot minimum use height is 50 feet below published MDA when using "level change", "vertical speed", "flight path angle (FPA)" or "altitude hold" modes.

3.2 Approach Categories (FAR 97.3):

The MD-10 and MD-11 are considered Category D aircraft for "Straight-In Approach" weather minima. Certain MD-10-10s may be considered Category C if, at their maximum certificated landing weight, 1.3 Vso is less than 141 knots (see the pertinent AFM and FAR 97.3(b)). The MD-10 and MD-11 are considered approach Category D aircraft for "Circling Approach" weather minima unless otherwise permitted or required by applicable operations specifications.

3.3 NO FLAP APPROACH:

Training and checking requirements include:

3.3.1 Training for and demonstration of approaches with no slats and normal flaps, no flaps and normal slats, and no slats or flaps is appropriate for the MD-10 and MD-11 aircraft. Training for Go-Around flap differences is appropriate. (i.e. MD-10 is 22 degrees and MD-11 is 28 degrees).

3.3.2 Credit for demonstration of a "No Flap/No Slat" approach in either a MD-10 or MD-11 aircraft is permitted for the other respective type if approved by the POI.

3.4 NORMAL "FINAL LANDING FLAP SETTING":

The normal "final landing flap setting" is considered to be either "Flaps 35" or "Flaps 50" for both MD-10 and MD-11.

3.5 MD-10 and MD-11 COMMON LANDING CREDIT:

The MD-11 must have FCC Software Load 908 or later to receive landing credit or 90 day landing currency is required. The Flight Control Computer (FCC) 908 software load package for the MD-11 improves landing qualities and enhances tail strike prevention. These handling quality improvements are transparent to the crew.
3.6 USE OF MD-10 and MD-11 "MAP" MODE DURING INSTRUMENT APPROACHES:

It is appropriate that crews monitor pertinent raw data navigation information during instrument approaches using the ND "MAP" mode. Raw data localizer and glideslope information on the PFD, and VOR, or NDB information on the ND, should be monitored to ensure consistency with ND map information. Some operators consider it good operating practice to have one pilot monitor the pertinent ND "APPR" or "VOR" display mode to validate information shown by the map display. Exclusive use of the "MAP" mode by both pilots during an instrument approach without some means of crosscheck (i.e. monitoring PFD LOC and GS data), is not appropriate. This is due to the potential for error associated with unreliable navigation signals, delays in updating following "IRS only" operations, FMS map drift, facility outages, or other such factors.

4. "MASTER DIFFERENCE REQUIREMENTS" (MDRs)

4.1 MDR TABLES:

Requirements for particular MD-10 and MD-11 variants are shown in Appendix 1. These provisions apply when differences between variants exist which affect crew knowledge, skills, or abilities (e.g. Level A or greater differences). Credit for certain maneuvers is permitted between MD-10 and MD-11 aircraft, as specified. This is appropriate since similar handling qualities and other common characteristics such as cockpit visibility may permit certain credit for training, checking, and currency (e.g. stalls and steep turns).

4.2 MDR FOOTNOTES:

Footnotes to MDR requirements define acceptable "required means" of compliance. A footnote can indicate requirements that are less restrictive than the basic designation, or more restrictive than the basic designation, depending on the significance of the differences between particular variants.

4.3 DIFFERENCE LEVEL DEFINITIONS:

Difference level definitions are as specified in AC 120-53. For convenience, a table summarizing these definitions is included with the MDR table in Appendix 1.

5. FAA APPROVED "OPERATOR DIFFERENCE REQUIREMENTS" (ODR) TABLES

5.1 ODR TABLES:

ODR Tables are to be developed by each individual operator when differences exist which affect crew qualification. An example ODR table related to MD-10 and MD-11 mixed fleet operations is shown in Appendix 2. This ODR table is provided only as an example and may not include items that are applicable to particular operators.

5.2 LANDING CURRENCY CREDIT PERMITTED BY ODR TABLES:

Credit for takeoff and landing maneuvers are permitted between MD-10 and MD-11 aircraft as specified in ODR tables. When approved by the FAA, an operator may have its pilots satisfy the requirement for three takeoffs and landings in the previous 90
days (FAR 121.439) by accomplishing those takeoffs and landings in either the MD-10, the MD-11, or by any combination of three takeoffs and landings in a MD-10 or MD-11. The MD-11 must have FCC Software Load 908 or later to receive this credit.

5.3 DISTRIBUTION OF FAA APPROVED ODR TABLES:

Distribution of the FAA Approved ODR Tables should be as follows:

5.3.1 Original FAA approved ODR tables are to be retained by the operator;

5.3.2 Copies of FAA approved ODR tables are to be retained by the Certificate Holding District Office (CHDO).

5.3.3 A copy of approved ODR tables should be provided to the MD-10 and MD-11 Flight Standardization Board (FSB) Chairman, Long Beach Aircraft Evaluation Group, (LGB-AEG).

6. FSB SPECIFICATIONS FOR TRAINING

6.1 GENERAL:

6.1.1 AIRMEN EXPERIENCE:

The provisions of this section of the report apply to programs for experienced airmen (i.e. airmen who have previous experience in FAR 121 air carrier operations, former military, commuter or corporate pilots with turbine powered aircraft experience, etc.). For airmen not having such experience additional requirements may be necessary as determined by the POI, FSB, and AFS-200.

6.1.2 MD-10 and MD-11 TRAINING PROGRAMS WITH DIFFERENCES BETWEEN AIRCRAFT:

When more than one variant of MD-10, MD-11, or combinations of MD-10s and MD-11s are flown in a mixed fleet, differences training programs meeting criteria specified by MDR tables must be described in ODR tables and approved by FAA, or the operator must have an alternate means of compliance as prescribed by Section 14 of this report. The only training program evaluated was receiving Initial and Transition Training in the MD-11 with Differences Training to the MD-10.

Any existing MD-10 program that is less comprehensive than the program shown in Appendix 2 should be reviewed and revised as necessary to meet MDRs. Any changes proposed to such existing programs making those programs less restrictive should not be approved without prior coordination with the MD-10 and MD-11 FSB chairman.

6.1.3 TAKEOFF SAFETY:

Because of frequent MD-10 and MD-11 operations at critical weight with runway limited takeoffs, particular emphasis on certain takeoff safety related topics is appropriate during training. This includes emphasis on the following:

a) The meaning and proper use of V1.
b) The importance of prompt and correct execution of a rejected takeoff (RTO), including the difference in brakes, aircraft with and without autobrakes and use of full braking capability.

c) The need to minimize exposure to high speed RTOs for minor difficulties unrelated to the ability of the aircraft to continue a safe takeoff.

d) Proper selection of flap settings and thrust levels for existing conditions and the need to set power before 80 knots.

e) Proper lineup and use of available runway.

f) Correct accountability for contaminated runway and/or reduced braking friction.

g) Consideration of use of Reduced V1 or Minimum V1 when runway in excess of critical field length is available.

h) Flap/Slat handle differences.

6.1.4 MD-10 and MD-11 ALTITUDE CALLOUTS DURING LANDING:

Radar altimeter callouts have been found to be beneficial during flare. Accordingly, for those MD-10 and MD-11 aircraft not equipped with automatic voice radar altitude callouts or tones, a crew procedure providing for a "non-flying" flight crewmember PNF, to make callouts during flare is recommended (e.g. callouts for 50', 30', 10' Radar Altitude).

For the MD-10 and MD-11, due to the minimum number of landings typically accomplished by each crewmember as a result of long stage lengths, and the need for the "pilot-not-flying" (PNF) to monitor other parameters during flare, use of automatic voice callouts (if installed) during flare is certified and appropriate. The procedures of MD-10 and MD-11 operators not electing to use automatic callouts should only be approved if use of an equivalent or better procedure or method is demonstrated.

6.1.5 AUTOMATIC LANDINGS:

If an operator conducts automatic landings in either the MD-10 or MD-11 then appropriate training must occur. This training must be conducted in the MD-10 or MD-11 training device, and/or simulator, or airplane.

However, due to the similarity between autoland systems in the MD-10 and MD-11, autoland training may occur in any MD-10 or MD-11 variant.

6.1.6 HAZARDOUS WEATHER AND WINTER OPERATIONS:

Proper precautions and procedures regarding hazardous weather/winter operations which may be unique to MD-10 and MD-11 aircraft should be addressed. For example, topics such as proper use of wing/(MD-11 tail) anti-ice, anti-skid braking characteristics when stopping on
slippery runways, appropriate autobrake settings or lack of autobrake, hazards associated with rejecting critical weight takeoffs near V1 on slippery runways, and other such topics are appropriate for emphasis in training programs due to the significant percentage of critical field length takeoffs.

6.1.7 CREWMEMBER EMERGENCY TRAINING (FAR 121.417):

Appropriate emergency training must be given to each crewmember on the location, type, function, and operation of each item of emergency equipment that is different in each MD-10 and MD-11 variant. Training may be accomplished by pictures or videotape if, prior to line operation, adequate knowledge of equipment use is demonstrated to an authorized representative of the operator for that variant in a static aircraft or approved training device.

a) Where equipment is common, instruction may be adjusted for those crewmembers qualified and current on other MD-10 and MD-11 variants, provided records are available which demonstrate that crewmembers meet FAR 121.417 and 121.683(a) requirements. For example, where elements of interior configurations are common, training may be simultaneously credited for variants.

b) For different emergency equipment, doors, slides, slide/rafts, rafts, communications, or other interior configuration elements, even when within the same series (e.g. MD-10-10 and -30), training on emergency equipment for each variant is required in accordance with MDRs.

6.1.8 MD-10 and MD-11 SPECIAL CHARACTERISTICS:

a) Critical Hydraulic Failure:

All MD-10 and MD-11 aircraft have the #3 hydraulic system modification, which permits limited control in the event of catastrophic tail section hydraulic failure. Crews must demonstrate familiarity with pertinent hydraulic system annunciation’s and knowledge of backup aircraft control and thrust management for such a hydraulic failure. An approach and landing should be accomplished with this critical hydraulic failure during initial, transition, and upgrade training. For crews currently qualified on one or both of these aircraft, if not already addressed, this issue should be addressed during a suitable recurrent training period on at least a one time basis. While demonstration of use of proper procedures and control in this configuration is appropriate, it is not an objective to train to proficiency in landing with this configuration.

b) Takeoff Rotation With Failure of #2 Engine:

Due to the location of the #2 engine, in the event of failure of the #2 engine a pilot will experience very light control forces at rotation. Pilots should be familiar with this characteristic and take precautions not to "prematurely rotate", "over rotate", or let
speed subsequently decay below V2 during initial climb.

c) MD-11 High Altitude Training:

Training in high altitude pilot induced oscillation (PIO) and upsets should be accomplished in the simulator. If inadvertently encountering speeds beyond Vmo/Mmo, the MD-11 LSAS speed protection feature may in some instances provide pitch control feedback that can lead to slight PIO during recovery. Crews should be aware of this characteristic and be advised that use of normal overspeed recovery techniques, including thrust reduction and a smooth increase of pitch attitude, are appropriate. The MD-11, due to engine performance, is able to operate at an altitude where the margin is reduced between high speed and low speed stalls. Also the MD-11 during cruise uses tail fuel management to maintain an aft CG near the limit, for fuel efficiency. A High Altitude training program and the aero data needed to upgrade the MD-11 training simulators is available from Boeing and should be incorporated into the operator’s training program.

d) Rotation, Flare, and Geometry Limits:

Due to fuselage geometry, crews must be clearly aware of the attitude at which tail contact can occur, proper rotation and flare technique, and flare and touchdown pitch characteristics of the aircraft with use of various flap, spoiler, reverse thrust, and CG conditions. This should be addressed for normal takeoffs and landings, with a wing or center engine inoperative, and for landing considering use of either auto spoilers or manual spoilers. Emphasis on MD-11 fuselage length should be addressed.

e) Aircraft System Controllers (ASC):

The MD-11 has four Automatic System Controllers and the MD-10 has three, with the Air Controller being manual only. Training must include dispatching with controllers in manual, especially the Fuel System Controller.

f) FADEC versus Non-FADEC Engines:

Training must include differences between FADEC and NON-FADEC engines, setting takeoff and go-around thrust, autothrottle differences and emphasis on preventing overboost with both engine types.

6.1.10 TRAINING FOR MD-10 and MD-11 "SEAT DEPENDENT" TASKS:

a) Proper accomplishment of certain tasks, procedures, or maneuvers require training of a crewmember for a particular crew position (i.e. captain, first officer, international relief officer, check airman, etc.). Thus training programs, including those programs leading to airman certification for an ATP Certificate
or type rating, should recognize and address the necessary seat/position related tasks for the applicable crewmember or certification that is intended. For example, an applicant for addition of an MD-11 type rating to an ATP Certificate would be expected to receive training in ground taxi by use of the steering tiller, including turns on narrow taxiways, accurately maneuvering to a jetway, and transitioning to or from the tiller during crosswind takeoffs or landings. Demonstrating taxi exclusively through use of rudder pedal steering would not be appropriate for a new PIC, even though such a demonstration may be entirely acceptable for training of a first officer. Accordingly, each training program should address seat dependent tasks or maneuvers to the extent necessary to satisfy crew qualification objectives.

b) The MD-10 and MD-11 tasks, procedures, or maneuvers which are considered to have seat dependent elements are as follows:

(1) Use of steering tiller during taxi.
(2) Rejected Takeoff.

c) Other items which could in certain circumstances have seat dependent elements, and may need to be considered and addressed as determined by each operator and POI on a case by case basis, include the following:

(1) Crosswind takeoffs and landings.
(2) Engine inoperative takeoffs and landings.
(3) Emergency communications.
(4) Loss of all generators.
(5) Loss of all engines.
(6) Emergency Descent.
(7) Operation on emergency power (DU Display configuration differences).

6.2 INITIAL, UPGRADE, and TRANSITION TRAINING:

6.2.1 Pilot Initial, Upgrade, and Transition Ground Training (FAR 121.419):

Pilot Initial, Upgrade, and Transition Ground Training is accomplished in accordance with FAR 121.419 or SFAR 58 Advanced Qualification Program (AQP) and must be accomplished on the MD-11. When more than one variant is to be flown or transition from one variant to another is to be accomplished, appropriate ground instruction in differences is required for each variant consistent with MDR provisions.

6.2.2 Pilot Initial, Upgrade and Transition Flight Training (FAR 121.424):

Pilot Initial, Upgrade and Transition Flight Training is accomplished in accordance with FAR 121.424 or SFAR 58 (AQP) and must be accomplished on the MD-11. When flight training is accomplished, and several variants are to be flown, flight training is to suitably address each variant consistent with MDR provisions.
6.2.3 Training Program Hour Reductions (FAR 121.405):

Training program hours may be reduced as specified in FAR 121.405, but may not be reduced to a level which is less than that set forth in the example of an acceptable MD-11 training program.

6.3 DIFFERENCES TRAINING (FAR 121.418):

6.3.1 General:

Initial or transition training program is completed for each MD-11 variant and differences training is necessary for each MD-10 variant as shown in the example of an acceptable MD-10 differences training program. Samples of acceptable ODR Tables for differences are shown in Appendix 2.

a) The differences training program in Appendix 2, for mixed-fleet flying, assumes a trainee has completed Initial, Upgrade or Transition Training in the MD-11 and will receive differences training for the MD-10 variant group(s).

b) Coverage of differences may be completed coincident either with each phase of Initial, Upgrade, or Transition Training, or following completion of that training.

6.3.2 Differences Ground Training:

Differences Ground Training in the topics applicable to the pertinent variant group or groups and shown by sample ODR tables and as shown in the example of an acceptable MD-10 differences training program is required.

6.3.3 Differences Flight Training:

Differences Flight Training is required in the topics and maneuvers applicable to the pertinent variant group or groups that are shown by sample ODR tables and as shown in the example of an acceptable MD-10 differences training program. For an Advanced Qualification (SFAR 58) Program, "Flight Qualification Events" must be consistent with items specified by the applicable ODR tables.

6.3.4 Engine Intermix:

Engine intermix operations (i.e. For the MD-10, different Pratt & Whitney JT9Ds or different GE CF6s with different levels of rated thrust, or for the MD-11 different PW4460s, etc.) are acceptable as specified by the AFM. If engine intermix limits and performance are clearly addressed (Vmcg, airport analysis, FAR 121.189 obstacle clearance, etc.), and this information is readily available to the flight crew and easily interpreted, then differences in the ODR tables are considered acceptable.

6.3.5 Passenger and Freighter Variants:

Mixed flying of Passenger, Combi, and Freighter Variants within the same variant group (i.e. MD-10-10 passenger and freighter configurations, or MD-11 passenger and combi)
may require compliance with additional MDR footnote limitations and ODR tables. This is appropriate due to differences in doors, fire protection provisions, emergency evacuation, and other areas.

6.4 RECURRENT TRAINING

6.4.1 Recurrent training must include appropriate training in accordance with FAR 121.427 for each variant group consistent with the items and levels specified by MDR and ODR tables for differences training.

6.4.2 Recurrent Flight Training requires appropriate maneuvers and procedures identified in FAR 121 Appendix E or as otherwise approved for an AQP in accordance with SFAR 58. For either case, maneuvers and procedures addressed must account for each variant group operated. ODR table provisions identify differences in maneuvers or procedures between variants which must be addressed in the operators recurrent program.

6.5 LOFT PROGRAMS (FAR 121.409(b)(3)):

When operators have LOFT programs and several variants, POIs should review LOFT credits to assure suitability for each variant. If simulators used for LOFT have differences from the variants actually flown, LOFT credits may be reduced or eliminated if such differences are determined to have a significant adverse effect on the effectiveness of LOFT. LOFT credit between MD-10 and MD-11 programs are acceptable.

6.6 OTHER TRAINING:

6.6.1 Designated Firefighter (Combi Only):

Prior to FAR 121 use of MD-10 and MD-11 "Combi" variants in service, POI's should coordinate with the FSB on the use of the "Designated Fire Fighter" training requirements, i.e., the "Combi Standards for Training", mandated by the "Combi AD-93-07-15", and agreed to by the FAA, Transport Canada, and the Joint Airworthiness Authority (JAA).

6.6.2 Flight Attendants:

Due to similarities in cabin configuration, Flight Attendants may be jointly qualified in all MD-10 and MD-11 variants. Such qualification, however, must address any differences in doors, slides, communications, and emergency equipment when common qualification applies.

6.6.3 Flight Dispatchers:

POIs assure that operators have complied with FAR 121.422, (Dispatcher Training) for all variants as follows:

Dispatchers may be simultaneously qualified for all MD-10 and MD-11 variants. However, for variants which have different performance, procedures, or limitations (i.e.
use "Flex" thrust ratings, MMEL, CAT III, Engine Intermix, or other such differences), dispatchers must be trained to suitably address those differences. Records should indicate the variants for which dispatchers are qualified.
7. FSB SPECIFICATIONS FOR CHECKING

7.1 GENERAL:

7.1.1 MD-10 and MD-11 Checks/Evaluations:

Checks or evaluations specified by FAR 61 Appendix A, FAA Order 8400.10, FAR 121 Appendix F, or SFAR 58 evaluations apply to MD-10 and MD-11 variants as permitted by MDRs and ODRs. FAR 121 differences checking items within each of the MD-10 and MD-11 types are accomplished as specified by MDRs and ODRs.

7.1.2 The following areas of emphasis should be addressed during checks as necessary:

a) Manual and Automatic flight:

Proficiency with both manual and automatic flight in normal and non-normal situations including the use of appropriate Flight Guidance System modes.

b) Unique features:

Proper use or understanding of features not commonly found on other transport aircraft such as "Dial-a-Flap", auto slat extend, or center landing gear, etc. and MD-10 flap/slat handle.

c) Unique Flight Characteristics:

Proper response to flight characteristics which may be different from other transport aircraft (i.e. proper pitch and lateral control following an engine failure during takeoff, particularly the number #2 engine); proper use of reverse thrust (particularly with an inoperative engine or reverser); suitable planning for and performance of a two engine inoperative landing; and proper taxi technique such as during turns between narrow taxiways.

d) Other characteristics:

Timely and correct response to situations that could be experienced with extended range/heavy weight aircraft such as demonstrating prompt and correct performance of RTOs on critical length runways; maintaining awareness of brake energy and brake temperatures following landings with short turnaround times, (i.e. MD-10 steel brakes versus MD-11 carbon brakes, following RTOs or during extended taxi); timely identification of the need for and initiation of fuel dumping; proper enroute fuel monitoring and management on extended range flights; and proper performance of extended range/over water navigation procedures (if applicable); proper method of disconnecting autopilot (i.e. never apply force to control wheel or column).

7.2. MANEUVERS/PROCEDURES:

7.2.1 FMS/GPS Demonstration of Competency:
a) FMS/GPS Checking for the MD-10 and MD-11 should include a demonstration of both normal and non-normal procedures as necessary. Training and Checking for clearances not normally given by ATC should be discouraged for Initial and Transition Training because it detracts from training in more critical areas. Specific items and flight phases to be checked include any applicable initialization, takeoff, departure, cruise, arrival, precision and non-precision approach, missed approach, holding, diversion to an alternate or route change, and pertinent non-normals.

b) For extended range over remote areas or oceanic operations, FMS/GPS use may include emphasis on items such as proper step climb considering enroute winds, engine-out diversion planning, and fuel management.

c) Since navigation must be accomplished through use of the FMS/GPS, a high degree of proficiency with BASIC FMS/GPS FEATURES should be exhibited to initialize or find necessary information to safely accomplish a flight, to properly configure the aircraft (confirm V speeds, adjust Thrust Limits, set CG, etc.), and to satisfy commonly accepted ATC clearances without undue delay. However, it is recognized that demonstration of mastery of each and every feature of FMS/GPS, use of the full range of alternative techniques, use of the optimum technique for a particular task, or use of extra/optimal features and other such "mastery level" skills common to experienced FMS/GPS users may not necessarily be mature at the time of initial certification of an applicant. The key factor to be evaluated is whether the applicant can safely, confidently, and expeditiously use the FMS/GPS to achieve the desired outcome and assure safe flight without undue errors, delays, distractions, or unsafe results.

d) Proper use of "standby navigation" mode should be demonstrated because use of standby navigation is not normally used in line operations.

e) Proper FMS/GPS use in conjunction with outside visual traffic scan, particularly in terminal areas, should be demonstrated. Prolonged fixation on FMS significantly detracting from outside scan should be avoided.

7.2.2 "No Flap/No Slat" Approaches:

Checking regarding "No Flap/Slat" Approaches for the MD-10 and MD-11 is conducted in accordance with the provisions of paragraph 3.3. "No Flap/No Slat" and "hydraulic system abnormal" approaches may be combined or addressed during training related to demonstration of the #3 hydraulic system enhancements.

7.2.3 MD-10 and MD-11 Specific Items:

a) Checklists:
Non-normal checklists supplied by the manufacturer are organized using a different method than commonly used for other transport aircraft and FAR 121 operators. However, the sequence of the manufacturers' checklist actions must not be changed. Thus, applicants should clearly demonstrate the ability to find pertinent items and accurately use MD-10 and MD-11 non-normal checklists in a timely manner, including use and understanding of related synoptic displays and any associated "consequences" messages. It should be noted that the "consequences" display is not an approved means to substitute for the abnormal or emergency checklist requirements of FAR 121.315.

b) Automatic Flight System:

Crews should have a clear understanding of Flight Control Panel (FCP) use including confirmation of mode arming and engagement and use of Flight Mode Annunciation's (FMA) on the PFD. Crews should be sufficiently familiar with the FCP and FMA to easily and reliably satisfy routine flight path control requirements, comply with typical ATC clearances, and respond to non-normal situations such as engine failure or emergency descent. Crews should not show confusion about which modes are armed or active, or how to select the mode desired. Crews should exhibit confidence in actions to take to accomplish a particular maneuver, not be surprised by the aircraft accomplishing a different maneuver than expected or failing to respond as intended. If the "speed protection" mode, "windshear" mode, or other such situations are encountered, an appropriate crew response should be evident. Crews should be trained to immediately take manual control of the airplane if FCP or FMA confusion occurs.

c) Engine and Alert (EAD) and Systems Displays (SD):

Proper use of EAD and SDs should be demonstrated in conjunction with both normal and non-normal procedures. It should be evident that critical information (total fuel, stabilizer position, bleed air pressure for start, etc.) can be easily found when necessary, even for situations in which a Display Unit (DU) may be inoperative.

d) Central Aural Warning System (CAWS):

Pilots should be sufficiently familiar with aural alert messages and be able to readily distinguish between those messages requiring awareness, attention, or action from messages that do not. For example, some messages are the result of a configuration that the crew is otherwise already aware of, some may result from a known inoperative component (MEL item), and some may be considered advisory only.

e) Communication Radio Management:

Clear understanding of the use of Communication Radio Panels and Audio Control Panels should be demonstrated. Flight Training Device (FTD) and
simulator training sessions should incorporate simulated ATC or company radio communications by using the simulator/FTD speakers or headsets. A clear understanding of the use of PA, Oxygen mask mic, VHF #1 radio, and cabin interphone for emergency communications should be evident.

f) Fuel System:

Because of the criticality of fuel computations during extended range/overwater flights, crews should be particularly familiar with the way fuel computations are made by the FMC, in addition to basic fuel quantity indications on the overhead panel and use of the fuel synoptic. The importance of issues such as entering enroute wind data into the FMC to get a proper destination fuel estimate, the effect of using fuel flow (FF) alone as the basis for FMC calculation of extra fuel rather than the normal "fuel flow plus fuel quantity" (FF+FQ), and proper use of ballast fuel should be clearly understood.

Training and checking with Fuel System in Manual, especially if MEL dispatch with Auto Fuel System Controller inoperative is planned.

7.3 TYPE RATINGS:

7.3.1 Oral Exam:

For a MD-11 Type Rating the oral portion of a type rating practical test must address the MD-11 aircraft. If the MD-10 is to be flown, differences may be addressed by a Check Airman, Training Center Evaluator, Instructor or FAA Inspector.

7.3.2 Pilot seat to be used:

The practical test for MD-11 ATP or Type Rating should be demonstrated from the left pilot seat unless otherwise specified or permitted by FAA for a particular operator (e.g. as specified by the POI in accordance with an applicable FAA Action Notice, AFS-200 directive, etc.).

7.3.3 Variant to be used:

Airmen may complete the necessary practical test in any MD-11 variant for issuance of a "MD-11" pilot type rating, with differences training to any MD-10 variant.

7.3.4 Differences:

Before airmen serve as Pilot-in-Command (PIC) under FAR 121 in a variant other than that in which a type rating practical test was completed, differences qualification in accordance with MDR and ODR provisions must be completed.

7.3.5 Preflight Inspection by Approved Pictorial:

Operators qualifying aircrews in one or more variants, and who conduct the "interior and exterior visual preflight inspection" portion of practical tests may use an approved pictorial means for checking and training for MD-10 and
MD-11 variants. Where crewmembers fly several variants and differences in emergency equipment exist, such as in the type and operation of doors (cargo), lower galleys, slides and slide/rafts, and other emergency equipment, operators must account for those differences in a manner acceptable to the FAA when applying provisions of an approved pictorial.

7.3.6 Airmen Not Employed Under FAR 121:

A practical test for an applicant intending to operate under FAR 91 or 125 should be conducted in a variant of the same group as that intended to be flown. Where a MD-11 Type Rating is sought, the test must be conducted using any MD-11 variant, with differences to any MD-10 variant, if the MD-10 is to be flown. The inspector should recommend that at least one of the following provisions be met prior to serving as PIC of a different variant than the one in which the original test was accomplished:

a) Completion of differences qualification in accordance with or equivalent to that specified for FAR 121 (e.g. compliance with MDRs and ODRs).

b) Completion of a proficiency check in accordance with FAR 61.58 completed in the variant(s) to be flown.

c) Completion of a proficiency check in accordance with or equivalent to that specified by FAR 121, a check conducted by a US military service or other equivalent check in an aircraft of the variant group to be flown.

Completion of a briefing by the evaluator or Inspector to an applicant regarding the desirability of additional differences training prior to flying other MD-10 or MD-11 variants. This may be noted by the inspector in the "Remarks" block of FAA Form 8410-2 (Airman Certificate and/or Rating Application) or adjacent to the "Inspector's Report" block of the FAA Form 8710-1.

7.4 PROFICIENCY CHECKS/EVALUATIONS:

7.4.1 MD-10 and MD-11 Proficiency Checks:

Except as specified in approved ODR tables, proficiency checks/evaluations may be administered in any MD-10 and MD-11 variant group.

7.4.2 Proficiency Checks addressing each variant flown:

When a proficiency check/evaluation addresses qualification in more than one variant, the check may primarily address one variant. However, portions of the check should be accomplished in relevant combinations of training devices, simulators, or aircraft, to ensure assessment of competency related to other variant(s) flown.

7.4.3 Substitution of recurrent flight training:
Satisfactory completion of a proficiency check may be substituted for recurrent flight training as permitted in FAR 121.433(c) for either the respective MD-10 or MD-11 types.

7.4.4 Alternating Proficiency Checks:

If crews fly MD-10 and MD-11 variants in a mixed-fleet, it is desirable but not mandatory for proficiency checks to alternate each six months for PICs, and annually for First Officers, unless otherwise authorized by the FAA (i.e. through an exemption which permits annual training/checking in lieu of each 6 mos.). When alternating checks are accomplished, the differences assessment for other respective MD-10 or MD-11 variants being evaluated may be satisfied by ground training, written questionnaire, oral review, or other method approved by the POI.

7.4.5 FAR 61.58 Checks:

Proficiency checks which may be required in accordance with FAR 61.58, but do not pertain to Part 121 operations, should be administered using the same variant or a variant within the same group as the aircraft intended to be flown unless otherwise authorized by the FAA.

7.5 USE OF FTDs FOR CERTAIN CHECK/EVALUATION ITEMS:

MD-10 and MD-11 Flight Training Devices may be used for certain additional check items for the ATP, Type Rating, Proficiency Check, or Proficiency Evaluation when approved by the FSB, NSP and POI (see Para 10.2.4).

7.6 ON-LINE EVALUATIONS (SFAR 58):

"On-line Evaluations" are to be completed for either MD-10 or MD-11 aircraft.

7.7 OPERATING EXPERIENCE (OE) (FAR 121.434, AC 120-53):

The same operating experience applies to the MD-10 and MD-11. Operating experience for the MD-10 and MD-11 may be accomplished in any MD-10 and MD-11 variant provided MD-11 FCC 908 or later software is installed. It is recommended that OE be accomplished in the MD-11. If MD-11 FCC 908 or later is not installed, OE is required for both MD-10 and MD-11.

7.8 QUALIFICATIONS OF FAA INSpectORS, EVALUATORS, OR CHECK AIRMEN:

For the purpose of airman certification, FAA Inspectors, Aircrew Program Designees (APDs), Evaluators, or check airmen should have completed appropriate qualification for the respective MD-10 or MD-11 variant(s) to be flown.

8. FSB SPECIFICATIONS FOR CURRENCY

8.1 CURRENCY (Recent Experience) FAR 121.439:

8.1.1 Currency required by FAR 121.439 is addressed for the MD-10 and MD-11 in the approved ODR tables. For programs
approved through ODR tables, currency is specified in accordance with MDRs.

8.1.2 Currency Credit:

Currency between MD-10 and MD-11 variant groups is permitted as shown by approved ODR tables. This is appropriate because handling characteristics of all MD-10s and MD-11s are common, provided MD-11 FCC 908 or later software is installed in the MD-11; if FCC 908 is not installed, 90 day landing currency is required.

Takeoffs and landings performed in one variant are equivalent to those performed in other variants if knowledge and procedural issues are suitably addressed through appropriate ODR table provisions.

8.1.3 Use of the Term "Segment" as Applied to Currency:

For the purposes of this FSB report, a segment consists of the following flight phases or maneuvers: Preflight, Start, Takeoff, Climb, Cruise, Descent, Approach, Landing, and Shutdown. Credit for a segment requires that a crewmember serve in an appropriate cockpit crew position during the necessary flight phases or maneuvers, but does not require the crewmember to physically control the aircraft or autopilot during those maneuvers. For example, both pilots may take credit for a segment even though only one actually controls the aircraft during the takeoff and landing. Credit for the cruise phase is achieved by serving in a crew position during any part of cruise. It is not necessary to serve in a crew position for the entire cruise time, since extended range flights may require crew relief. Pilots may not take credit for a segment by observation from a jumpseat, or by serving in a relief capacity during the cruise phase of flight only, regardless of flight time accrued in cruise. Cumulative completion of a segment is permitted. A segment may be completed in one flight, or by cumulatively completing the necessary phases and maneuvers in more than one flight. For example, a takeoff, departure, and initial cruise may be performed on one extended range flight, and descent, approach, and landing on the next, allowing credit for a single segment.

8.2 METHODS FOR RE-ESTABLISHING CURRENCY:

8.2.1 Re-Establishing currency at Level A, B, or C:

If necessary, currency is re-established at difference levels A, B, or C as provided in AC 120-53.

9. OPERATIONAL COMPLIANCE CHECKLIST

9.1 General:

Compliance checklists are provided as an aid to FAA Certificate Holding District Offices (CHDOs) in identifying those specific rules or policies for which compliance has already been
demonstrated to FAA for a particular aircraft type, variant, or variant group. The checklist also notes rules or policies which remain to be demonstrated to CHDOs by operators.

9.2 MD-10 and MD-11 Compliance Checklist:

An MD-10 and MD-11 compliance checklist is provided in Appendix 4. Compliance was determined by inspection of and for only the first production completed airplane. Compliance for the MD-10 was determined on the freighter variant only.

9.3 Discussion of Specific Compliance Items:

9.3.1 Emergency Evacuation - MD-10:

An emergency evacuation demonstration in accordance with FAR 121.291 was successfully completed for the DC-10 including configurations, Flight Attendants and passenger capacities listed on the Type Certificate Data Sheet as specified in FAA Order 8400.10 Vol. 3, Chapter 10, Section 7. Maximum passenger capacity is 380. This also applies to the MD-10, however, a mini-evacuation is required for each new passenger MD-10 operator.

9.3.2 Emergency Evacuation - MD-11:

An emergency evacuation demonstration in accordance with FAR 121.291 was successfully completed for the MD-11 including configurations, Flight Attendants and passenger capacities listed on the Type Certificate Data Sheet as specified in FAA Order 8400.10 Vol. 3, Chapter 10, Section 7. Maximum passenger capacity is 410. A mini-evacuation, however, is required for each new MD-11 operator.

9.3.3 FAR 121.291 Ditching Demonstration - MD-10:

Due to the similarity of doors, slides/rafts, and procedures, credit for a DC-10 full scale ditching demonstration is permitted for the MD-10. Accordingly, use of a "Partial Ditching Demonstration" is permitted for the MD-10 in accordance with FAA Order 8400.10, Vol. 3, Section 4.

9.3.4 Proving Runs, FAR 121.163:

a) MD-10:

Proving runs in accordance with FAR 121.163 (c) are appropriate in accordance with FAA Order 8400.10, Vol. 3, Chapter 9. Credit in the form of proving run time reductions may be given for previous DC-10 and MD-11 experience for that operator, when such previous experience is directly applicable.

b) MD-11:

Initial FAR 121 proving runs in accordance with provisions of FAR 121.163(a) have been completed by the initial FAR 121 operator of the MD-11. Subsequent proving runs in accordance with FAR 121.163(b) are
appropriate in accordance with FAA Order 8400.10, Vol. 3, Chapter 9. Credit in the form of proving run time reductions may be given for previous DC-10 experience for that operator, when such previous experience is directly applicable.

9.3.5 MD-10 and MD-11 Forward Observer Seat:

The center/right forward observer seat is designated as the Administrator’s seat, for meeting the requirements of FAR 121.581. Other cockpit observer seats (left) may be used by FAA inspectors at their discretion, such as when observing check airmen in the performance of their duties.

10. FSB SPECIFICATIONS FOR DEVICES AND SIMULATORS

10.1 DEVICE AND SIMULATOR CHARACTERISTICS:

Device and simulator characteristics pertinent to MD-10 or MD-11 variants are as specified by FAR 121.407, FAR 121 Appendix H, the FAA NSP, AQP Advisory Circular, or AC 120-53, except as described below.

10.2 SPECIAL DEVICE REQUIREMENTS:

Special device or simulator characteristics are described for training, checking, and re-establishing currency as follows:

10.2.1 The FSB has determined the minimum device for differences training from MD-11 to MD-10 is a fully functional Level 4 FTD with the following systems: Overhead Panel (including System Controllers and Fire Loops); Glareshield Control Panel (GCP); Center Instrument Panel; Flight Management Systems (FMS); Forward Pedestal (including Flaps, Throttles and Start Levers).

10.2.2 When different engine display formats are used, due to operation with different engine types (MD-10-10/GE-CF6, MD-10-30/GE-CF6 and MD-10-40/PW-JT9 or MD-11 GE-CF6 and PW-4460 etc.), crews should be exposed to the alternate engine instrument presentations by some means (i.e. CBT, simulator, photos, drawings, etc.) adequate to assure proper display interpretation and use.

10.2.3 The combination of training devices and simulators should adequately address training requirements resulting from differences in optional equipment (e.g. CAWS altitude callouts, hydraulic/pneumatic thrust reverser differences in engine types (FADAC, Non FADAC), split cue/integrated cue flight directors, RCWS use, etc.).

10.2.4 Use of FTDs for Certain Check/Evaluation Items:

During static operations certain FAA approved MD-10 and MD-11 flight training devices (FTDs) have identical characteristics to Level C or D Simulators, therefore certain ATP, type rating, or proficiency check/evaluation items may be completed in those FTDs. This is appropriate for items such as preflight FMS initialization, or engine start non-normals. Specific checking credit in such instances must be approved by the POI following coordination with the NSP. When such credit is approved by the POI, use of this credit for a particular check is
at the discretion of the FAA inspector/APD conducting the check.

10.3 AIRCRAFT, SIMULATOR AND DEVICE COMPATIBILITY (Ref. FAR 121.407):

When variants are flown in mixed fleets, the combination of simulators and training devices used to satisfy MDR and ODR provisions must match specific variants flown by that operator. The acceptability of differences between training devices, simulators, and airplanes operated must be addressed in the training program by the POI.

10.4 DEVICE APPROVAL:

Requests for training device approval should be made to the POI. If training device characteristics clearly meet established FAA criteria and have been approved by the National Simulator Evaluation Team (NSP), the POI may approve those training devices for that carrier. Where training devices do not clearly satisfy a given level, POIs should request advice from the FSB Chairman, NSP, or Flight Standards, Air Transportation Division, Washington DC, (AFS-200).

11. APPLICATION OF FSB REPORT

11.1 OPERATORS WITH ONLY ONE VARIANT (no differences):

Apply relevant parts of this report (i.e., Type Rating designation, checking maneuvers related to FAR 121, etc.) following the effective date of this report.

11.2 OPERATORS WITH A MIXED FLEET:

11.2.1 In addition to the provisions of paragraph 11.1 as described above, compliance with MDRs, ODRs, and other relevant FSB report provisions is necessary.

11.2.2 For the MD-10 and MD-11, compliance with this report should be established prior to any FAR 121 operations.

12. ALTERNATE MEANS OF COMPLIANCE:

12.1 APPROVAL LEVEL AND APPROVAL CRITERIA:

Alternate means of compliance to differences requirements of FAR 121 Subpart N and O for mixed fleet operations, other than as specified in provisions of this report, must be approved by Flight Standards, Air Transportation Division (AFS-200). If Alternate compliance is sought, operators will be required to establish that the proposed alternate means provides an equivalent level of safety to the provisions of AC 120-53 and this FSB report. Analysis, demonstrations, proof of concept testing, differences documentation, or other evidence may be required.

12.2 EQUIVALENT SAFETY:

In the event alternate compliance is sought, training program hour reductions, simulator approvals, and device approvals, may be significantly limited and reporting requirements may be increased to assure equivalent safety. FAA will generally not consider relief by alternate compliance unless sufficient lead
time has been planned by an operator to allow for any necessary testing and evaluation.

12.3 INTERIM PROGRAMS:

In the event of clearly unforeseen circumstances in which it is not possible for an operator to comply with MDR provisions, the operator may seek an interim program rather than a permanent alternate compliance method. Financial arrangements, scheduling adjustment, and other such reasons are not considered "unforeseen circumstances" for the purposes of this provision.

13. MISCELLANEOUS - RESERVED
APPENDICES
APPENDIX 1

MASTER DIFFERENCE REQUIREMENTS
MASTER DIFFERENCE REQUIREMENTS
MD-10 and MD-11

<table>
<thead>
<tr>
<th>MASTER DIFFERENCES REQUIREMENTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>From Base Airplane</td>
</tr>
<tr>
<td>MD-11</td>
</tr>
<tr>
<td>C* /B /B</td>
</tr>
</tbody>
</table>

Note: C* means MD-10 initial differences training only. Recurrent training should be accomplished at Level B/B/B in conjunction with a full §61 or §121 check.

DIFFERENCE LEVEL DEFINITIONS

<table>
<thead>
<tr>
<th>DIFFERENCE LEVEL</th>
<th>TRAINING</th>
<th>CHECKING</th>
<th>CURRENCY</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Self Instructions (or integrated with next PC)</td>
<td>Not Applicable</td>
<td>Not Applicable</td>
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<tr>
<td>B</td>
<td>Aided Instruction</td>
<td>Task or System Check</td>
<td>Self Review</td>
</tr>
<tr>
<td>C</td>
<td>Systems Devices</td>
<td>Partial Check Using Device</td>
<td>Designated System</td>
</tr>
<tr>
<td>D</td>
<td>Maneuver Devices</td>
<td>Full PC Using Device*</td>
<td>Designated Maneuver</td>
</tr>
<tr>
<td>E</td>
<td>Simulator C/D or Aircraft #</td>
<td>Full PC using Simulator C/D or Aircraft *</td>
<td>Per FAR’s (Takeoffs &amp; Landings in Simulator C/D or the Aircraft)</td>
</tr>
</tbody>
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# = at Level E FAA type Rating is Assigned
* = IOE is Required
PC = Proficiency Check
APPENDIX 2

EXAMPLE OF ACCEPTABLE ODR TABLES
### KEY

<table>
<thead>
<tr>
<th>FLT CHAR</th>
<th>FLIGHT CHARACTERISTICS</th>
</tr>
</thead>
<tbody>
<tr>
<td>PROCDS</td>
<td>PROCEDURES CHANGES</td>
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<tr>
<td>CK</td>
<td>CHECKING LEVEL</td>
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<tr>
<td>CUR</td>
<td>CURRENCY REQUIREMENTS</td>
</tr>
<tr>
<td>FLT CHK</td>
<td>FLIGHT CHECK</td>
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### METHODS KEY

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<tr>
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<th>SEGMENT(S)</th>
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<tbody>
<tr>
<td>CBT</td>
<td>COMPUTER BASED TRAINING</td>
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<tr>
<td>FTD</td>
<td>FLIGHT TRAINING DEVICE</td>
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<tr>
<td>PT</td>
<td>PROCEDURE TRAINER</td>
</tr>
<tr>
<td>SS</td>
<td>SELF STUDY</td>
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<tr>
<td>PC</td>
<td>PROFICIENCY CHECK</td>
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<tr>
<td>RT</td>
<td>RECURRENT TRAINING</td>
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## Operator Differences Requirements Table (ODR)

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<thead>
<tr>
<th>DESIGN FEATURE/SYSTEM</th>
<th>REMARKS</th>
<th>COMPLIANCE METHOD</th>
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<tr>
<td>AIRPLANE CONFIGURATION</td>
<td>Dimensions</td>
<td>TRAINEE CUR</td>
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<tr>
<td></td>
<td>Landing Gear</td>
<td>FLT CHAR</td>
</tr>
<tr>
<td>PANEL LAYOUT</td>
<td>Switches/Gages (Adds &amp; Deletes) Switch Changes Switch Relocation</td>
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</tr>
<tr>
<td>WEIGHTS</td>
<td>Changes Related to Series</td>
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<td>POWERPLANT</td>
<td>General Electric CF-6</td>
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<td>ATA 21</td>
<td>AIR CONDITIONING &amp; PRESSURIZATION</td>
<td>AIR SYSTEM</td>
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<td>PRESSURIZATION</td>
<td>Delete: Ditching Switch</td>
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<td>AUTOFLIGHT</td>
<td>Autothrottles</td>
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<td>ATA 23</td>
<td>COMMUNICATIONS</td>
<td>On-Board Maintenance Terminal Enhances FPWS</td>
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<td>ATA 24</td>
<td>ELECTRICAL</td>
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<tr>
<td>ATA 25</td>
<td>EMERGENCY EQUIPMENT</td>
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<tr>
<td>ATA 26</td>
<td>FIRE PROTECTION</td>
<td>Engine &amp; APU Test</td>
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<td>ATA 27</td>
<td>FLIGHT CONTROLS</td>
<td>Flap/Slat Handle Operations Spoiler Operation Speed Brake Operations (No interconnect w/flaps)</td>
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<td>BASE AIRCRAFT: MD-11</td>
<td>COMPLIANCE METHOD</td>
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<tr>
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<td><strong>REMARKS</strong></td>
<td><strong>FLT CHAR</strong></td>
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<td>Delete: Tail De-ice Ice Detection System</td>
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APPENDIX 3

EXAMPLE OF AN ACCEPTABLE MD-11 TRAINING PROGRAM

(FAR 121 Appendix E Program)

(FAR 121 Appendix H Program)

and

MD-10 DIFFERENCES TRAINING PROGRAM
General

This document is intended to outline a typical, but not the only acceptable, approach to MD-11 Initial and Transition Pilot training. This program consists of Ground and Flight Training Segments. The Ground Training Segment consists of 15 days, encompassing 120 hours of integrated training. The Flight Segment consists of 10 days, encompassing 40 hours of simulator training.

Training Program Philosophy:

Both Ground and Flight Training Segments of the MD-11 training program are operational in nature. The Ground Training Segment follows the principle of presentation of information through programmed instruction followed by reinforcement of that instruction in Flight Training Devices. Following successful completion of the Ground Training Segment, the trainee enters the Flight Training Segment, which is designed to build upon the student's prior learning by introducing progressively more complex maneuvers and procedures.

This program is derived from a task analysis expressed as Crew Performance Objectives (CPOs). CPOs were defined by the ATA Training Committee as guidelines for training and include need-to-know information required to perform normal, abnormal and emergency procedures. It is presumed that a trainee entering this program will be a Commercial Pilot meeting the ATP eligibility requirements with Multi-Engine turbojet experience but with no experience in Electronic Information Systems (EIS), Inertial Navigation and Reference Systems (INS and IRS), Autothrottle (A/T) or Flight Management Systems (FMS).

Training Methods and Devices:

Training program materials are presented utilizing stand-up instruction, video tape, interactive computer based training, cockpit procedures trainers, flight training devices (FTDs) and flight simulators.

Trainees are normally paired as crews for all portions of the training program involving hands-on cockpit operations. Trainee performance is evaluated on a daily basis by their instructor(s). Evaluation is also accomplished with CBT module tests and scheduled progress checks within the training program.

During the ground training segment, trainees will normally spend one-half of their training day in CBT and classroom instruction and one-half their training day with an instructor in preparation and execution of the associated FTD modules.

Flight training using FTDs, a flight simulator and an airplane follows the ground training segment. The program outlined in this document provides for either Advanced Simulator Training under FAR 121, Appendix H, with associated Line-Oriented Flight Training (LOFT) or under FAR 121, Appendix E and FAR 61, Appendix A, with associated aircraft training and evaluation.
MD-11

INITIAL AND TRANSITION TRAINING

Ground Training

OBJECTIVES:

The Ground Training Segment of the MD-11 Initial and Transition Training Program develops crew performance objectives through a precise specification of learning objectives, programmed instruction, and post training performance evaluation to insure that the student will:

a) Understand and be able to operate all aircraft systems.
b) Be proficient in all normal, abnormal, and emergency procedures.
c) Have acquired the knowledge and skill required to proceed to flight training.

Flight Training

OBJECTIVES:

Flight Training Segment uses Level 5 FTDs and Level C flight simulators. The crew concept approach is used throughout flight training. At completion of training the student will:

a) Be able to safely and efficiently operated the MD-11 aircraft.
b) Demonstrate a satisfactory level of proficiency in all required maneuvers and procedures.

A typical MD-11 initial and transition program is presented below. This curriculum is designed for a combination of level B (CBT), C (CPT/Task Trainer), and level E (FFS) training. System integration is introduced in the FTD during the ground training segment. Day 25 is divided into either flight training and check in the aircraft or LOFT training under FAR 121 Appendix H.
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**NOTES:**
1. DAYS 16 through 25 are Flight Training Modules.
2. FTD = Flight Training Device (Level 5 or higher).
3. CPT = Cockpit Procedures Trainer.
4. CBT = Computer Based Training.
5. SIM = Flight simulator (Level C or Higher).
6. * For programs conducted under FAR 121, Appendix H.
MD-10 Differences:
Systems Integration Training

TRAINING OBJECTIVE
Initial MD-10 systems differences indoctrination for MD-11 qualified personnel.
This program consists of a minimum of three days training. One day of CBT and
two days of flight training in a Level 4 FTD. The FSB has determined the minimum
device for differences training from MD-11 to MD-10 is a fully functional Level
4 FTD with the following systems: Overhead Panel (including System Controllers
and Fire Loops); Glareshield Control Panel (GCP); Center Instrument Panel;
Flight Management Systems (FMS); Forward Pedestal (including Flaps, Throttles
and Start Levers).

REQUIRED CBT
Aircraft General Flight Controls Ice and Rain
APU Landing Gear/Brakes FMS-NAV
Air System Fire Systems Instruments
AIU Fuel Powerplants
MD-10 Exterior Differences

REQUIRED READING
FCOM Chapter 1 - Limitations
FCOM Chapter 2-0 - Emergency and Abnormal Procedures, MD-10 Phase One Callouts

DAY ONE

BRIEF (2 HRS)
• General Concepts
  Method of “Blanking” unavailable functions on MD-10
• Flight Controls
  LSAS Differences
    Operation without LSAS
  Panel Differences
  Trim Considerations

  Slat Position Differences
  Normal slat positions
  TO and LANDING depiction on the CONFIG synoptic.

  Flap/Slat Handle Design
    Flap and Slat Handle Description
    Flap and Slat Handle linkage.
    Flap Quadrant Detents and Gates

    Flap and Slat Handle operation

  Auto Ground Spoiler Deployment
  Ground Spoiler actuation
Spoiler Gate Protection
Flight Limitations
Flight Lockout differences

Aileron Hydraulic Source
Implication on Autopilot system

- Air
  Auxiliary Air Panel
  Auxiliary Air Panel (AAP) Differences

AAP purposes
  Operation of the ECON switch.
  Effect on ECON switch on all packs
  Manual Trim Air Valves rocker switches operation
  Purpose of using Manual Trim Air Valves Rocker Switches
  When Manual Trim Air Valves Rocker Switches should be used

Cargo Heat Control
  CARGO HEAT switch location
  Purpose of switch
  CARGO HEAT operation

General Differences
  Air System Control Panel
  Manual Operation requirements
  Manual Operation considerations

Cooling Door Differences
  Pack Cooling Door operation as related to Air Conditioning Pack selection

Avionics Compartment
  Overheat Light
  Differences
  Meaning of illumination

Ditching Switch Omission
  Implications of omitted Ditching Switch
  Pack Cooling Door Closure
  Checklist usage

Cargo Heating and Controls
  Lower Cargo Compartment Temperature Control Differences
  2 variations of forward lower cargo compartment temperature control on the MD-10
  MD-10-10’s and some MD-10-30’s
  Circulation patterns
  Temperature Control
Other MD-10-30’s
Forward compartment
Ventilation
Upper Maintenance Panel controls

Center and Aft compartment Temperature Control

- Flight Instruments
  Versatile Integrated Avionics Computers (VIAs)
  VIA Architecture
    Overall Purpose of VIA system
  VIA Architecture
    Number installed
    Purposes of VIA’s 1 and 2
    Purpose of AUX VIA
  
  DU Information Source
    Normal DU control for each VIA
    VIA Failure and Back-up
    AUX VIA selection
  
  Operation with Single VIA
    Capabilities when solely operating on VIA 1 or 2
  
  Dual VIA 1 and 2 Failure
    Systems affected
    DU back-up input
  
Aircraft Interface Unit
  AIU
    General Description of AIU
    Purpose of AIU
    Number of AIU’s installed
    AIU Backup capability
    Systems affected by each AIU
    Indications associated with AIU Failure
    Impact of AIU Failure on Electrical and Hydraulic System Synoptics

Air Data Inertial Reference Units
  ADIRU
    General Description of Air Data Inertial Reference Unit.
    Comparison of MD-11 CADC and IRU functionality on MD-11 to ADIRU functionality on MD-10
    
    Number of ADIRU’s
    Respective output of each ADIRU to Flight Instruments
  
  SISP control
    Offside selection
SISP nomenclature as related to MD-10 CADC

AUX ADIRU switch location

Alternate Static Source Differences
  Omission
  ADIRU Functionality

Global Navigation System
  GNS
    General Description
    Number Installed
    Transparency to Crew

  IRU Updating
  MCDU indications
  ZULU Time availability
  Inhibiting Functionality
  Active Updating indications

  GNS Position Information
    GNS position indications on MCDU

Multifunction Control and Display Unit
  Speed Computation and Entry Differences
    TO/APPR page computations unavailable as a result of lack of MD-10
    FMF V-speed calculations
    SLOPE/WIND
    OAT

    Manual V-speed entry
    Manual V-speed entry PFD indications

  CG Computation Omission
    Affect of fewer fuel probes on MD-10 vs. MD-11
    Inflight CG indication differences

- Powerplants/Autoflight
  FADEC Components, Controls and Indication Differences
    FADEC Omission
    FADEC Panel differences
    Impact on Engine control
    Monitoring concerns

  Start Switch Differences
    Switch location

  Fuel Lever Differences
    Design Differences
    Functionality
Fire Indications

Operation

N1 Display Throttle Position Indication Differences
N1 Indications
   Throttle Resolver Angle omission
   Operation of Throttles in relation to N1 indications

"FUEL OFF" Display Omission
   "FUEL OFF" Indication differences

Autothrottle System differences
   Impact of FADEC omission on Autothrottle power setting
Cautions
Procedures

Engine Vibration Monitoring Omission
   EVM system Omission
   Indication differences

- Auxiliary Power Unit
  Normal/Standby Switch
     APU Control differences
        Normal mode
        Standby mode
        When used
        Impact on N1 speed
        Effect of Electrical load

APU Start Procedures Differences
   APU Start and Shutdown controls
APU Electrical Load Assumption Differences
   Controls
   Procedures
   Implications

APU Shutdown Differences
   Controls
   Procedures
   Implications

APU Air Control Differences
   Isolation Valve control differences

- Fire Protection
  Engine Fire Detection Panel
     Purposes of EFDP
     Controls
     Indications
• Landing Gear/Brakes
  Automatic Brake System Differences
  ABS Omission on MD-10-10
  MD-10-30 ABS
  Auto Brake Arm Switch
  Location
  Purpose
  Implications of not setting

Brake Temperature Monitoring System Differences
  BTMS Omission on MD-10-10
  MD-10-30 BTMS

Tire Pressure Indicating System Omission
  TPIS Omission on all MD-10s
  Indication differences on CONFIG synoptic display

Antiskid System Differences
  Test Button
  Purpose
  When used
  Location

Brake Pressure Indicating System Differences
  Gauge Layout
  Source pressure for each gauge

Brake Construction Differences
  General description
  Implications

• Handling Characteristics
  Normal Landing
  Effect of landing Flaps 50
  Implications of trimming and “holding aircraft off” during flare
  Implications of flaring too early or abruptly
  Implications of using aerodynamic braking

Pitch up Differences
  Importance of “Nose-lowering” procedures on touchdown
  Benefits of lowering nose on touchdown
DAY TWO

PROCEDURES AND MANEUVERS (4 HRS) (MINIMUM LEVEL 4 FTD)

• Upper and Lower Maintenance Control Panel

• Cockpit Seats Differences
  Electric operation
  Manual operation

• Auxiliary Air Panel
  Auxiliary Air Control Panel
  Discuss Location
  Demonstrate manual Trim Air Switch use
  Discuss Cargo Heat Switch use

• Ignition Control Panel
  Ignition Control Panel Differences
  Discuss Panel “Blanking” for unavailable functions

• Air Control Panel
  Differences
  Discuss manual Air System configuration requirements
  Demonstrate APU AIR switch operation
  Discuss manual Isolation Valve configuration

  Auxiliary Air Panel
  Demonstrate ECON switch use with all 3 packs operating

ECON/Cabin Altitude Switch Differences
  Discuss Cabin Altitude Light omission
  Discuss High Cabin Altitude Indications

Pack/Bleed Switch Light Differences
  Discuss Pack and Bleed Air switch flow and press light omission
  Discuss associated alert indications

Cooling Door Differences
  Demonstrate Air Conditioning Pack shutdown
  View Pack Valve Position Indications for selected Pack on Upper
  Maintenance Panel

Lower Cargo Compartment Temperature Control Differences
  Locate Forward Cargo Temperature Selector Switch
  Discuss Maintenance’s role in forward Cargo Temperature Selector Switch
  use

• Fuel Control Panel Differences
  Show LCD quantity readout omission
  Discuss Tail Fuel omission implications

• AUX Tank Depiction Differences
View MD-10-30 AUX Tank Fuel Synoptic Indications
Discuss Aux Fuel Tank depiction

- Engine Fire Detection System Control Panel
  Eng/APU Fire Test Switch Location Differences
  Demonstrate Engine/APU Fire Test with both A and B Loop switches
  Discuss associated indications

  Demonstrate Engine/APU Fire Test with each switch, A and B, individually
  Discuss associated indications

  Discuss proper normal position for Loop switches
  Discuss when Loop switches are positioned out of normal setting
  Demonstrate a “Battery Only” fire test and point out the difference

- APU Control Panel
  APU Start Procedures Differences
  Discuss APU start control
  Demonstrate normal APU start
  Discuss automatic Electrical Load assumption omission

  APU Electrical Load Assumption Differences
  Demonstrate connection of APU Generator to Electrical System
  View Electrical Synoptic Indications

  Normal/ Standby Switch Differences
  Demonstrate Standby mode operation
  Discuss Standby mode similarities with current FedEx operation
  Discuss when Standby mode is used

- AFS Control Panel
  LSAS Differences
  Discuss omission of LSAS on MD-10

- Engine Start Switch
  Start Switch Differences
  Locate Start Switch

- MD-11 Ditching Switch Location
  Ditching Switch Differences
  Note the absence of the Ditching Switch

- Landing Gear Control Panel
  BTMS/TPIS Differences
  View BTMS indications on CONFIG synoptic
  Discuss TPIS omission

- ABS Control Panel
  ABS Differences
  Locate ABS ARM switch
• Antiskid Control Panel Area
  Antiskid Test Button Differences
  Locate Anti-Skid Test button.

  Antiskid Switch Differences
  Locate Anti-Skid switch.

  Brake Pressure Indicator Differences
  Point out the dual pressure gauges

• Fuel Levers
  Fuel Lever Differences
  Demonstrate Fuel Lever operation
  Demonstrate ON and OFF Locking Pin and Detent positioning
  Emphasize implication of not locking Fuel Levers into position

• Throttle Differences
  Demonstrate Throttle operation
  Discuss Throttle Dimension differences
  Discuss Go-Around button similarities to MD-11

• Flap/Slat Handle
  Flap/Slat Handle Design Differences
  Demonstrate Flap/Slat Handle operation to 0/EXT
  Demonstrate Slat Retraction from 0/EXT position
  Demonstrate Flap extension to 22/EXT from 0/EXT
  Discuss Flap/Slat handle gate
  Demonstrate Flap extension from 22/EXT to 50/EXT
  Demonstrate Flap Retraction from 50/EXT to 22/EXT
  Discuss potential difficulties related to gate
  Demonstrate Flap retraction from 22/EXT to 0/EXT
  Demonstrate Slat retraction from 0/EXT to UP/RET
  Demonstrate Dial-a-Flap selection to 17/EXT
  Demonstrate Flap extension to Dial-a-Flap setting
  Discuss Dial-a-Flap wheel slot and effect on Flap setting operations
  Discuss Flap-setting procedures out of Dial-a-Flap position
  Discuss purpose for setting Dial-a-Flap to “index=0” position after takeoff
  Demonstrate splitting of Flap/Slat handles
  Discuss “splitting” restrictions
  Demonstrate Flap setting procedures with Flap/Slat handles split
    View indications on CONFIG synoptic of Flap movement in relation to Slat position
  Demonstrate Flap/Slat handle reconnection procedures
    Discuss Flap/Slat handle disconnect similarity to MD-11 Slat Stow button
  Demonstrate Flap retraction from 35/EXT to 15/EXT

• MCDU
Keypad Difference
   Locate ATC key and the blank key adjacent to it.
   Discuss non-functionality of keys

REF Page Difference
   Discuss additional page 2

Speed Computation and Entry Differences
   View OAT and Slope/Wind omissions on TO/APPR page
   Discuss manual V-speed entry requirement

GNS Differences
   Discuss GNS updating indication on ND and FMS INIT page
   Discuss GNS updating to IRU’s
      Locate GNS-updated Present Position information on MCDU INIT page

      Locate GNS position on MCDU, POS REF, page 2

Clock Control Function Differences
   Discuss ND clock source
   Discuss Master Clock omission on MD-10
PHASE OF FLIGHT APPLICATION (MINIMUM FTD LEVEL 4)

- Interior Safety Check
  Discuss MD-10-10 Parking Brake setting during loading differences

- Flight Deck Preparations (Captain)
  Monitor the following areas:
  - Eng/APU fire test
  - APU start
  - APU electrical power and bleed air application
  - Trim Air Panel (or AAP if installed)
  - Cargo Heat switch
  - MD-10/AIR MANUAL check

- Flight Deck Preparations (F/O)
  Accomplish F/O Flight Deck Preparation
  Discuss similarity to MD-11 procedure

- Before Start Checklist
  Conduct AIR MANUAL checklist.

- Engine Start
  N1 Display Throttle Position Indication Differences
  Review N1 indications during start

- After Start Checklist
  Accomplish APU shutdown (including APU AIR switch)
  Accomplish AIR MANUAL checklist

- Taxi (Before Takeoff Checklist)
  Slat Position Differences
  View Slat indications on CONFIG synoptic during position change
  Air System
  Accomplish AIR MANUAL checklist

- Takeoff
  Autothrottle System
  Discuss importance of PNF monitoring N1 settings during takeoff roll
  PNF demonstrate N1 monitoring during takeoff roll (see Par. 6.1.9.f)

- After Takeoff Checklist
  Flap/Slat Handle Design
  Monitor the retraction of the flaps/slats.
  PNF demonstrate After takeoff Dial-a-Flap setting

- En Route Flight
  Spoiler Gate Protection
  Demonstrate Spoiler handle movement to Ground Spoiler Position
Emphasize hazards associated with in-flight Spoiler deployment to Ground Spoiler position

CAC Manifold Fail Differences
Accomplish CAC Manifold Fail checklist with CAC Manifold Fail malfunction inserted

AIU Failure
View effects of AIU failure on AIR and Secondary Engine displays

Operation with Single VIA
View effects of AUX VIA failure
Discuss Dispatch flexibility with AUX VIA deferred
Accomplish VIA 1 Failure checklist

Dual VIA Failure Differences
Discuss the accomplishment of “VIA FAILURES” checklist with VIA 1 and VIA 2 failed
Discuss implications of Dual VIA failure on dependent systems

ENG_LOOP_Differences
Accomplish Eng 1 Loop B checklist through fire warning activation

• Approach Briefing
  Slat Disagree Malfunction when slats are extended

• Before Landing Checklist
  Normal anti-skid test
  Alternate Testing Means

• Go-Around / Missed Approach / Rejected Landing
  Flap/Slat Handle Differences
  Demonstrate Flaps 22/EXT position use in Go-Around

• After Landing Checklist
• Shutdown Checklist
• Additional practice and opportunity for questions

DEBRIEF (1 HR)
• Answer any questions
• Emphasize positive performance points
• Provide constructive criticism
• Preview next training event

CONDITIONS
N/A
DAY THREE

Procedures And Maneuvers/Line-Oriented Flight Training (4 hrs) (Minimum Level 4 FTD)

- General Concepts
  The LOFT is used to expose the crew to various malfunctions that are unique to the MD-10. These malfunctions are introduced at different times throughout the flight and are listed in the events scenario.

- Line-Oriented Flight Training Scenario
  - Cold weather operations
  - MEL Fuel System Auto Controller Inop
  - MEL APU Standby Mode Only (Normal Def.)
  - MEL Aux Via Inop
  - MEL Eng 1 Loop B Inop
  - Start Malfunction -- Hot Start
  - VFR cold weather
  - CAC manifold failure
  - Single Via failure
  - AIU failure
  - Engine fire loop illuminated
  - Localizer or Cat 1 approach

- Debrief
APPENDIX 4

AIRCRAFT COMPLIANCE CHECKLIST
MD-10 AND MD-11 COMPLIANCE CHECKLIST

Items that are identified as "CHDO" need to be evaluated by principal inspectors at the Certificate Holding District Office prior to a MD-10 and MD-11 being used in FAR 121 revenue service. Items marked "complies" have either been found to directly comply with the applicable rule, or the necessary data or procedures are available to permit assessment of compliance of a MD-10 and MD-11 for a particular operation (i.e. takeoff obstacle clearance assessment pertinent to FAR 121.189). Items marked NA are not applicable to MD-10 and MD-11 aircraft.

Not all rules, policies, or MD-10 and MD-11 variants are necessarily addressed by this checklist (e.g. Combi, and Rolls Royce powered variants have not been evaluated). When differences exist between the variant(s) evaluated with the compliance checklist and variant(s) used by an operator, the CHDO evaluates those differences and approves use of the variant if that variant provides equivalent compliance with FARs or FAA policies. It remains the responsibility of a Certificate Holding District Office to review compliance with pertinent rules or policies not already satisfactorily addressed in this compliance checklist prior to FAR 121 approval of an operator for use of a particular MD-10 and MD-11 variant. MD-10 passenger variant(s) have not been evaluated.

FAR 91

<table>
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<tr>
<th>REF.</th>
<th>SUBJECT</th>
<th>FINDING</th>
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<tbody>
<tr>
<td>91.9</td>
<td>Civil aircraft flight manual, marking, and placard requirements.</td>
<td>Type design complies.</td>
</tr>
<tr>
<td>91.21</td>
<td>Portable electronic devices</td>
<td>CHDO.</td>
</tr>
<tr>
<td>91.117</td>
<td>Aircraft speed.</td>
<td>Type design complies. Increased speed notification to ATC (speeds above 250 KIAS below 10000'MSL) may be appropriate if clean maneuvering speed is higher. CHDO.</td>
</tr>
<tr>
<td>91.191</td>
<td>Category II Manual.</td>
<td>CHDO if operated under FAR Part 91.</td>
</tr>
<tr>
<td>91.203</td>
<td>Civil aircraft: Certifications Required.</td>
<td>CHDO.</td>
</tr>
<tr>
<td>91.205</td>
<td>Powered civil aircraft with standard category U.S. airworthiness certificates; instruments and equipment requirements.</td>
<td>Type design complies, except (b) (11). CHDO.</td>
</tr>
<tr>
<td>91.207</td>
<td>Emergency locator transmitters.</td>
<td>NA</td>
</tr>
<tr>
<td>91.209</td>
<td>Aircraft lights.</td>
<td>Type design complies.</td>
</tr>
<tr>
<td>91.211</td>
<td>Supplemental Oxygen.</td>
<td>Type design complies.</td>
</tr>
<tr>
<td>91.213</td>
<td>Inoperative instruments and equipment.</td>
<td>Type design complies, MMEL available.</td>
</tr>
<tr>
<td>91.215</td>
<td>ATC Transponder and altitude reporting equipment and use.</td>
<td>Type design complies.</td>
</tr>
</tbody>
</table>
91.217 Data correspondence between automatically reported pressure altitude data and the pilot's altitude reference. Type design complies.

91.219 Altitude alerting system or device; turbojet powered civil airplanes. Type design complies. 91.219(c) CHDO.

91.221 TCAS Type design complies.

91.317 Provisionally certified civil aircraft; operating limitations. NA

91.409 Inspections. CHDO.

91.413 ATC transponder tests and inspections. CHDO.

91.415 Changes to aircraft inspection programs. CHDO.

91.503 Flying equipment and operating information. Type design check lists and procedures comply. CHDO.

91.511 Radio equipment for overwater operations. Type design complies. CHDO.

91.513 Emergency equipment. CHDO.

91.517 Smoking and safety belt signs. Type design complies.

91.519 Passenger Briefing Seat back cards not evaluated. CHDO.

91.521 Shoulder harness. Type design complies.

91.525 Carriage of cargo. Type design complies.

91.527 Operating in icing conditions. Type design met requirements of (b) and (c).

91.603 Aural speed warning device. Type design complies.

91.605 Transport category civil airplane weight limitations. Weight, balance, and performance information is available for compliance. CHDO.

91.609 Flight recorders and cockpit voice recorders. Type design complies.

91.611 Authorization for ferry flights with one engine inoperative. Type design complies. CHDO.

91.805 Final compliance, Subsonic airplanes. Type design complies. (Stage 3)
<table>
<thead>
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<th>FAR 121</th>
<th>CHDO</th>
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<td>121.141 Airplane or rotorcraft flight manual.</td>
<td>Type design AFM complies. CHDO.</td>
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<tr>
<td>121.157 Aircraft certification and equipment requirements.</td>
<td>Type design complies with (b).</td>
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<tr>
<td>121.173 General.</td>
<td>Type design complies with (b) and (d).</td>
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<td>121.189 Transport category airplanes: Turbine engine powered; takeoff limitations.</td>
<td>Type design complies. CHDO.</td>
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<tr>
<td>121.191 Transport category airplanes: turbine engine powered: Enroute limitations: One engine inoperative.</td>
<td>Type design complies. CHDO.</td>
</tr>
<tr>
<td>121.193 Transport category airplanes: Turbine engine powered: Enroute limitations: Two engines inoperative.</td>
<td>Type design complies. CHDO.</td>
</tr>
<tr>
<td>121.195 Transport category airplanes: Turbine engine powered: Landing limitations: Destination airports.</td>
<td>Type design complies. CHDO.</td>
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<tr>
<td>121.197 Transport category airplanes: Turbine engine powered: Landing limitations: Alternate airports.</td>
<td>Type design complies. CHDO.</td>
</tr>
<tr>
<td>121.285 Carriage of cargo in passenger compartments.</td>
<td>CHDO.</td>
</tr>
<tr>
<td>121.287 Carriage of cargo in cargo compartments.</td>
<td>CHDO.</td>
</tr>
<tr>
<td>121.289 Landing gear: Aural warning device.</td>
<td>Type design complies.</td>
</tr>
<tr>
<td>121.291 Demonstration of emergency evacuation procedures.</td>
<td>Complies, except (b) through (e) CHDO. (see para 9.4.2)</td>
</tr>
<tr>
<td>121.303 Airplane instruments and equipment.</td>
<td>Type design complies.</td>
</tr>
<tr>
<td>121.305 Flight and navigational equipment.</td>
<td>Type design complies.</td>
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<td>121.307 Engine instruments.</td>
<td>Type design complies.</td>
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<td>121.308 Lavatory fire protection.</td>
<td>Type design complies.</td>
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<td>121.309 Emergency equipment.</td>
<td>Type design complies, except (b) (l) CHDO.</td>
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<tr>
<td>121.310 Additional emergency equipment.</td>
<td>Type design complies. CHDO responsible for (b), (c), (d), (f), (g), (h), and (l). NA for (j) and (k).</td>
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<tr>
<td>Section</td>
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<td>Instruments and equipment for operations at night.</td>
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<td>Instruments and equipment for operations under IFR or over-the-top.</td>
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<td>121.329</td>
<td>Supplemental oxygen for sustenance: Turbine engine powered airplanes.</td>
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<td>121.333</td>
<td>Supplemental oxygen for emergency descent and for first aid: turbine engine powered airplanes with pressurized cabins.</td>
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<td>Equipment for operations in icing conditions.</td>
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<td>Pitot heat indication systems.</td>
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<td>121.345</td>
<td>Radio equipment.</td>
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<td>121.347</td>
<td>Radio equipment for operations under VFR over routes navigated by pilotage.</td>
</tr>
</tbody>
</table>
121.349 Radio equipment for operations under VFR over routes not navigated by pilotage or for operations under IFR or over-the-top.
Type design complies, except procedures for (d) are responsibility of CHDO.

121.351 Radio equipment for extend overwater operations and for certain other operations.
Type design complies, except (b). CHDO.

121.353 Emergency equipment for operations over uninhabited terrain areas: flag and supplemental air carriers and commercial operators.
CHDO.

121.355 Equipment for operations on which specialized means of navigation are used. (FAR 121 Appendix G)
Type design complies for inertial navigation. FAR 121 Appendix G, type design complies, except 1., 4., 5., and 7. CHDO.

121.357 Airborne weather radar equipment requirements.
Type design complies; (c) responsibility of CHDO.

121.358 Low-altitude windshear system equipment requirements.
Type design complies.

121.359 Cockpit voice recorders.
Type design complies, except (b) NA.

121.360 Ground proximity warning-glide slope deviation alerting system.
Type design complies, except (d) and (e). CHDO.

121.369 Manual requirements.
Type design related data and manuals comply, otherwise CHDO.

121.397 Emergency and emergency evacuation duties.
Type design complies. Operator specific functions, CHDO.

121.485 Flight time Limitations. (Crew rest facility)
The suitability of a crew rest facility to comply with 121.485 (a) must be demonstrated. Proposals for crew rest facilities submitted to a FSDO should be coordinated with LGB-AEG prior to approval.

121.576 Retention of items of mass in passenger and crew compartments.
Type design complies, otherwise CHDO.

121.578 Cabin ozone concentration.
Aircraft meets requirement by type design.

121.579 Minimum altitudes for use of autopilot.
Compliance based on AFM procedures and limitations (see para 3.1.2). CHDO.

121.581 Forward observer's seat: En route inspections.
Type design complies (see para 9.4.6).

121.587 Closing and locking of flight crew compartment door.
Type design complies; operator procedures CHDO.
121.589 Carry-on baggage. Type design complies; operator procedures CHDO.

121.629 Operation in icing conditions. Type design complies. The MD-11 suggested criteria for underwing frost assessment was not evaluated; otherwise CHDO.

121.652 Landing weather minimums: IFR: All certificate holders. "High limit" landing minima qualification for PIC's applies to MD-10 and MD-11 aircraft.

MISCELLANEOUS

a. ADVISORY CIRCULAR

1) AC 00-50A - LOW LEVEL WIND SHEAR - Windshear alerting and flight guidance systems have been evaluated and complies. If the system is inoperative, procedures consistent with AC 00-50A and the FAA Windshear Training Aid should be used.

2) AC's 20-129, 20-130, 25-15 and 90-45A - AREA NAVIGATION, VNAV, MULTI SENSOR NAVIGATION SYSTEMS IN US NAS - the MD-10 and MD-11 FMS meets requirements for enroute or approach area navigation systems when radio updating is taking place. Aircraft may file "/G" flight plan suffix for routes having suitable VOR/DME/GPS coverage.

3) AC 90-79 - USE OF ELECTRONIC NAVIGATION IN REMOTE AREAS - Aircraft systems and procedures are consistent with this AC.

4) AC 91-6A - WATER, SLUSH, AND SNOW ON RUNWAY - Aircraft systems and procedures are consistent with this AC.

5) AC 91-53 - NOISE ABATEMENT DEPARTURE PROFILE - Aircraft systems and procedures are consistent with this AC when using a 1000' Above field elevation (AFE) acceleration altitude, cutback to climb thrust at 1500' AFE or upon reaching 0/EXTEND, climb at 0/RETRACT maneuvering speed to 3000' AFE, and then accelerate to 250 KTS. If 0/RETRACT maneuvering speed is greater than 250 KIAS, climb may be made at that speed to 10,000 MSL, after advising ATC of the need for a climb speed above 250 KTS. Since "PROF" mode of the FMS has a default altitude for initial thrust cutback of 1500' AFE and an initiation of acceleration altitude set at 3000' AFE, PROF mode is not used below 3000' AFE by US Operators.

6) AC 120-28C - CATEGORY III - AFM provisions address Category III requirements for fail-operational systems using "Dual Land". Approval is limited to Category III based on use of a fail-operational system. Credit for use of fail-passive Cat IIIa (Single Land) is not yet authorized. (see 8400.10 and as necessary, consult AFS-410).

7) AC 120-29 - CATEGORY I AND II - Aircraft systems and procedures are consistent with AC 120-29 and Order 8400.10 for Category I and II. The AFM and Master Minimum Equipment List (MMEL) include reference to acceptable aircraft configurations, which were demonstrated. Procedures and requirements are as addressed by US standard operations specifications and Order 8400.10. Demonstration of Category II for the MD-10 and MD-11 was based on use of the automatic
radio altitude callout feature during flare. Operators not using this automatic callout feature should specify procedures and conduct training providing an equivalent level of safety which are acceptable to FAA.

8) AC 120-33 - NAVIGATION SYSTEMS FOR APPROVAL IN MINIMUM NAVIGATION PERFORMANCE STANDARD (MNPS) AIRSPACE - Aircraft systems and procedures are consistent with AC 120-33.

9) AC 120-35B - LOFT/LOS - Aircraft systems and procedures, and training, checking, and currency identified by the FSB are consistent with this AC. Specific provisions related to LOFT are addressed by paragraph 6.5.1 of this report.

10) AC 120-38 - CABIN OZONE CONCENTRATIONS - MD-10 and MD-11 systems prevent harmful levels of ozone concentration. Systems and procedures are consistent with this AC.

11) AC 120-51 COCKPIT RESOURCE MANAGEMENT - MD-10 and MD-11 systems, checklists, and procedures are consistent with use of this AC.

12) AC 121-13 - SELF CONTAINED NAVIGATION SYSTEMS - Aircraft systems and procedures are consistent with AC 121-13.

13) AC 91 RVSM - Reduced Vertical Separation Minimum - MD-10 and MD-11 aircraft meet the requirements for RVSM.

b. FAA DIRECTIVES, POLICIES, AND US AIRMAN’s INFORMATION MANUAL:

1) The FAA Flight Plan designator is MD-11 for all MD-11 variants and MD-10 for MD-10 variants. All MD-10 and MD-11 aircraft may file with a /G flight plan suffix based on DME/GPS updating of the FMS. No unique air traffic requirements are applicable to the MD-10 and MD-11 aircraft.

2) The MD-10 and MD-11 are considered a "Heavy" aircraft and flight plans should be so designated. Wake turbulence characteristics are similar for all MD-10 and MD-11 variants.

3) For some MD-10 and MD-11 aircraft, airspeeds in excess of US standard limits (greater than 250 KIAS below 10,000 MSL...) may be necessary during departure. In such instances, crews should advise ATC of speeds to be used, when speeds in excess of standard limits are necessary.
APPENDIX 5

HEAD-UP-DISPLAY/ENHANCED FLIGHT VISUAL SYSTEM
(HUD/EFVS)

The subject of this report is the installation, by Supplemental Type Certificate (STC), of two follow-on systems that were not part of the original type design of the MD-10/MD-11 aircraft; a Honeywell Head-Up-Display (HUD) and Kollsman Enhanced Flight Visual System (EFVS).

The MD-10/MD-11 Flight Standardization Board (FSB) participated in evaluation of Federal Express flight crew ground, simulator and flight training program for the HUD/EFVS using Federal Express MD-10 aircraft in Memphis, Tennessee. The ground training consisted of four hours of classroom instruction, two hours of HUD/EFVS DVD training, four hours of simulator training and four hours of training in the aircraft. Each FSB member performed three takeoff guidance takeoffs, flew three HUD approaches using CAT I, CAT II and CAT III procedures, during day, Visual Meteorological Conditions (VMC) and simulated Instrument Meteorological Conditions (IMC). The FSB also evaluated Federal Express proposed MD-10/MD-11 Airplane Flight Manual (AFM) Supplement for HUD Operations and Federal Express proposed CAT II/III appendix to the MD-10/MD-11 AFM Supplement for Category II operations. The FSB found the HUD/EFVS operationally acceptable for all phases of flight and for U.S CAT I, CAT II and CAT III operations.

The HUD/EFVS crewmember training requirements consists of those related to initial and recurrent ground and flight training. Unless covered concurrently during an initial or transition type rating course, a prerequisite to beginning this course of training is prior training, qualification and currency in the MD-10/MD-11 aircraft. The program focuses primarily upon training events flown in the left seat by the pilot-in-command (PIC) in FAR 121 operations. Flight crewmember training must include a review of Title 14 CFR Section 91.175 and a review of the Supplemental Type Certificate (STC) AFM Supplement for the MD-10/MD-11 aircraft installed HUD/EFVS system.

Flight crewmember training must be accomplished using a level ‘C’ simulator, with a daylight visual display, or a level ‘D’ simulator that has been approved by the National Simulator Program for EFVS, or the aircraft. The FSB has determined that each pilot in command of an aircraft equipped with HUD/EFVS should receive a minimum of 4 hours of ground school training followed by a minimum of 4 hours of simulator training (minimum of two hours in the left seat) of a level ‘C’ simulator, with a daylight visual display, or level ‘D’ simulator. A MD-10/MD-11 equipped HUD/EFVS aircraft may also be used in lieu of a simulator for training. In-flight training should consist of a minimum of 4 hours of flying in the left seat of the HUD/EFVS System equipped aircraft. The flight portion of the training should consist of a minimum of two (2) takeoffs using takeoff guidance, two (2) day and two (2) night approaches with and without vertical guidance. A person who progresses successfully through flight training, is recommended by an instructor, and successfully completes the appropriate HUD/EFVS proficiency check by a person authorized by the Administrator, need not complete the recommended 4 hours of flight training.
For airline operators, initial training should be conducted in accordance with the applicable provisions of FAR 121.415, 121.419, 121.424, 121.427 FAA AC 120-28C, and the airline operation specifications. It is recommended that the initial ground training program include the following:

1. Classroom instruction covering HUD/EFVS operational concepts, crew duties and responsibilities and operational procedures including preflight, normal and non-normal pilot activities. For operators wishing credit for low visibility operations predicated on use of HUD/EFVS, information should be provided on the operation characteristics, capabilities, and limitations of the ground facilities (surface movement guidance control system) and airborne CAT III system. Airline policies and procedures concerning low visibility operations should include a reporting process, MEL issues, operation following a missed approach, IOE and currency requirements.

2. Classroom instruction on the HUD/EFVS symbology and its inter-relationship with airplane aerodynamics, internal factors and environmental conditions.

3. A HUD/EFVS pilot training manual or equivalent material in the Operations Manual which explains all modes of operation, the use of various HUD/EFVS controls, clear description of HUD/EFVS symbology including limit condition and failures, and incorporating a crew procedures guide clearly delineating pilot-flying (PF) and pilot-not-flying (PNF) duties, responsibilities and procedural call-outs and responses during all phases of flight during which HUD/EFVS operations are anticipated. Emphasis on the availability and limitations of visual cues encountered on approach both before and after DH. This would include:

- procedures for unexpected deterioration of conditions to less than minimum RVR encountered during approach, flare and rollout.
- demonstration of expected visual references with weather at minimum conditions.
- expected sequence of visual cues during an approach in which visibility is at or above landing minima.

4. A video tape/DVD demonstrating all modes of HUD/EFVS operation with sound. For operators wishing credit for low visibility operations predicated on use of the HUD/EFVS, this should include narrative descriptions and several low weather approach demonstrations with procedural call-outs and responses. All critical procedural callout possibilities should be covered.

5. If the HUD is used as a CAT II landing system, emphasis on the need for rigorous crew discipline, coordination and adherence to procedural guidelines

6. Special Emphasis Ground Training:
   a. Crew coordination
   b. Crew briefing and callouts
   c. Duties of flying and non-flying pilots
   d. Transition from EFVS imagery to non-EFVS, visual conditions. Maximum use of videotapes of actual EFVS approaches as seen through the combiner should be used.
   e. Visual anomalies such as “noise” parallax, and “blooming”.
   f. Importance of cross checking the HUD instrument presentations against the EFVS visual scene presentation to enable the pilot to
recognize malfunctions of the ground based ILS equipment and improper presentation of elements in the visual scene during the approach.

- HUD Takeoff guidance modes of operation.
- Proper utilization of the Flare CUE.
- HUD/EFVS emergency operations.
- Importance of ensuring descent on an obstacle-free glide path when operating below the MDA during non-precision approaches.
- Angle-of-Attack (AOA) Indicator purpose/use.
- Multifunction Control Display Unit (MCDU) interface/operation.
- Use of Aircraft Braking Scale

7. Special Emphasis Flight/Simulator Training:
   - Transition from EFVS imagery to non-EFVS, visual conditions and runway acquisition.
   - Crew briefings and callouts including annunciation of published minima and operation below DA(H) or MDA(H).
   - Importance of the “design eye position” in acquiring the proper EFVS image.
   - Use of the HUD/EFVS Control Wheel Switch.
   - Precision and non-precision instrument approaches in both day and night conditions.
   - Use of caged and un-caged modes in crosswind conditions.
   - EFVS repeater (if installed) – Imagery quality and crew coordination.
   - Proper utilization of the Flare CUE.
   - HUD Takeoff Guidance modes of operation.
   - HUD/EFVS emergency operations.
   - TCAS resolution advisory.
   - Recovery from unusual attitudes.
   - Use of the flare symbol as a cue (not guidance).
   - Use of Angle-of-Attack (AOA) during wind-shear recovery.
   - Use of Aircraft Braking Scale during rejected takeoff/landing.

8. Checking: Checking requires a proficiency check conducted in a level “C” simulator, with a daylight visual display or in a level ‘D’ simulator, that has been approved by the National Simulator Program for EFVS, or on an EFVS aircraft. The proficiency check will include at least one instrument approach to published minimums and landing utilizing the EFVS. This check can be accomplished concurrently with a proficiency check or competency check in accordance with 61.57, 61.58, 121.441, 121.913, and 121.915.
9. **Currency**: If 61.57(c) is being used for currency, at least one of the 6 required instrument approaches must be accomplished using the EFVS to published minimums.

**NOTE**: The EFVS is certified for use as an aid during all phases of flight: taxi, take-off, climb, cruise, descent and landing.