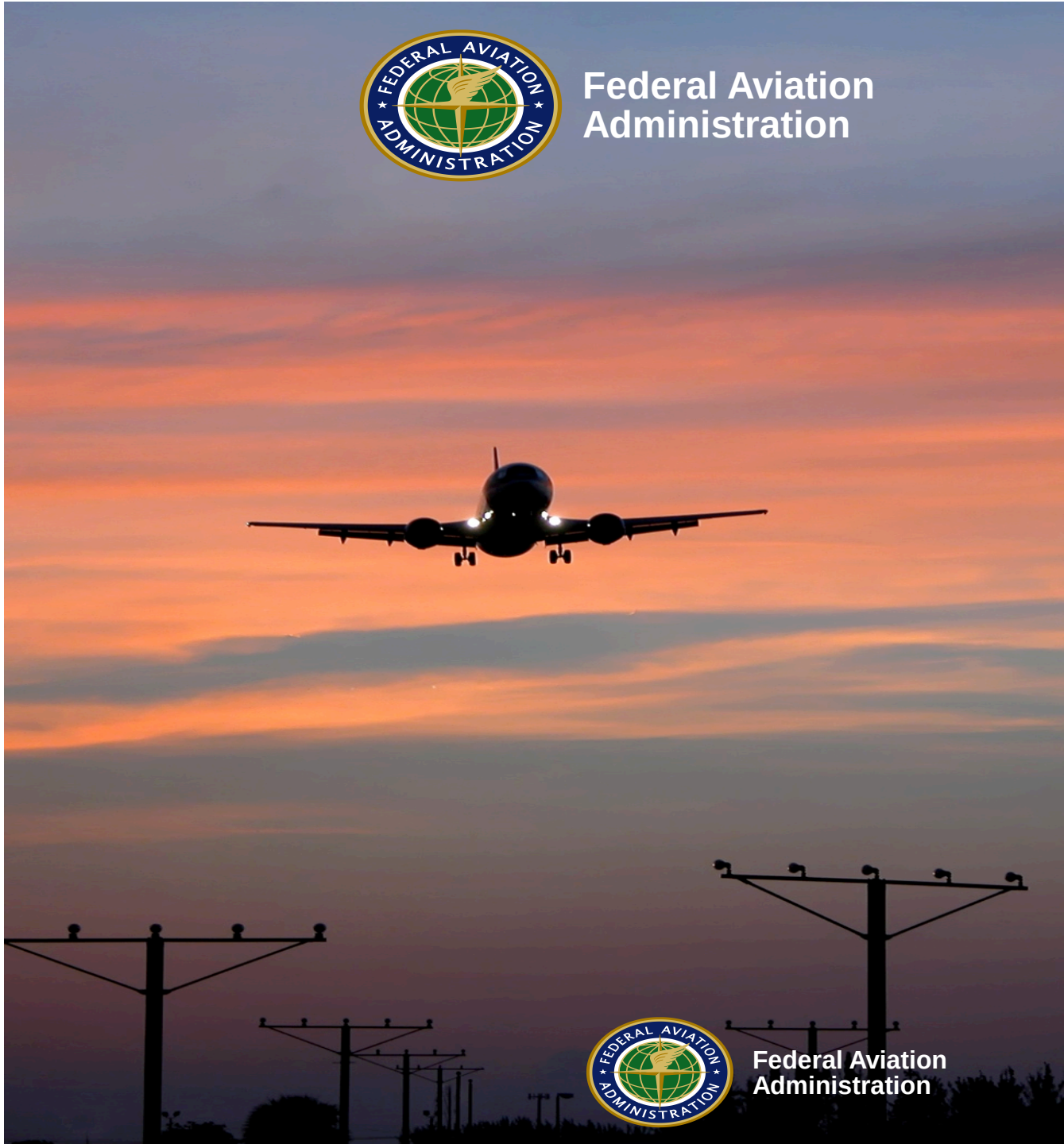
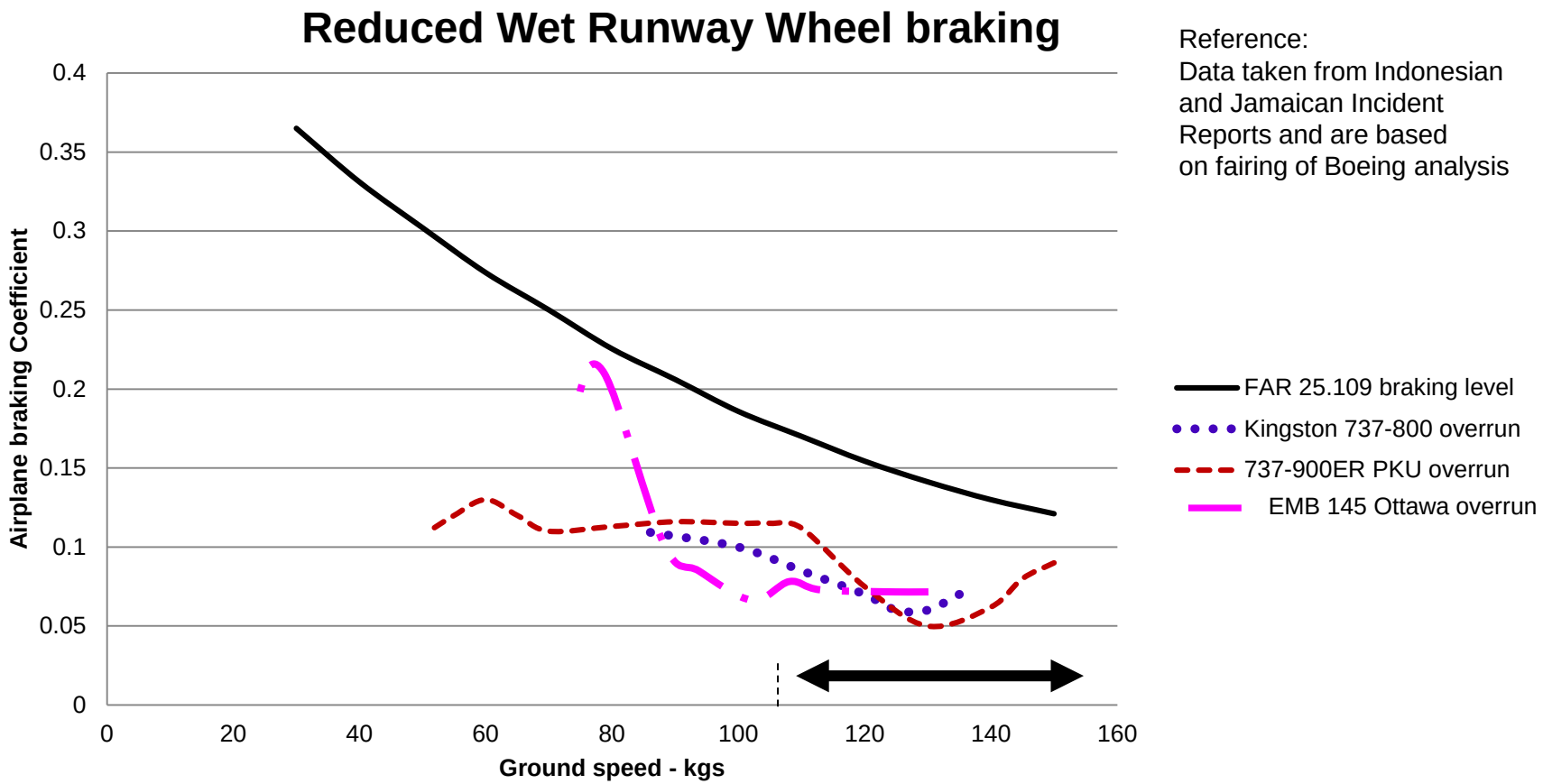
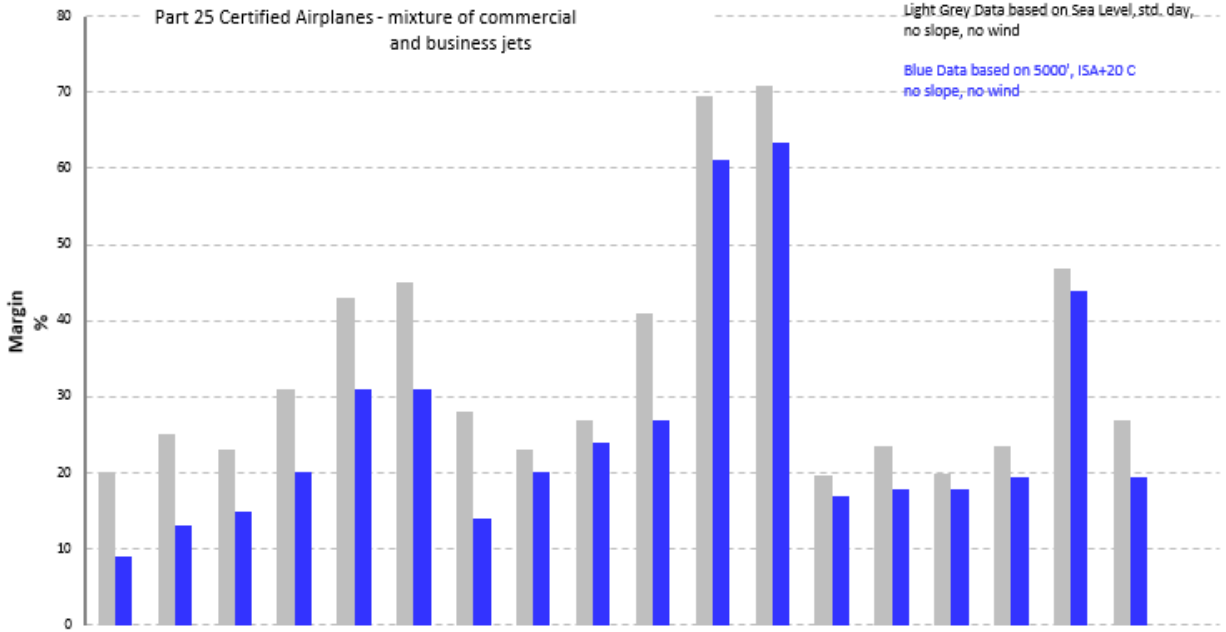
Wet Runway Proposed Regulation
Task 2 & 3 Topic 9
FTHWG



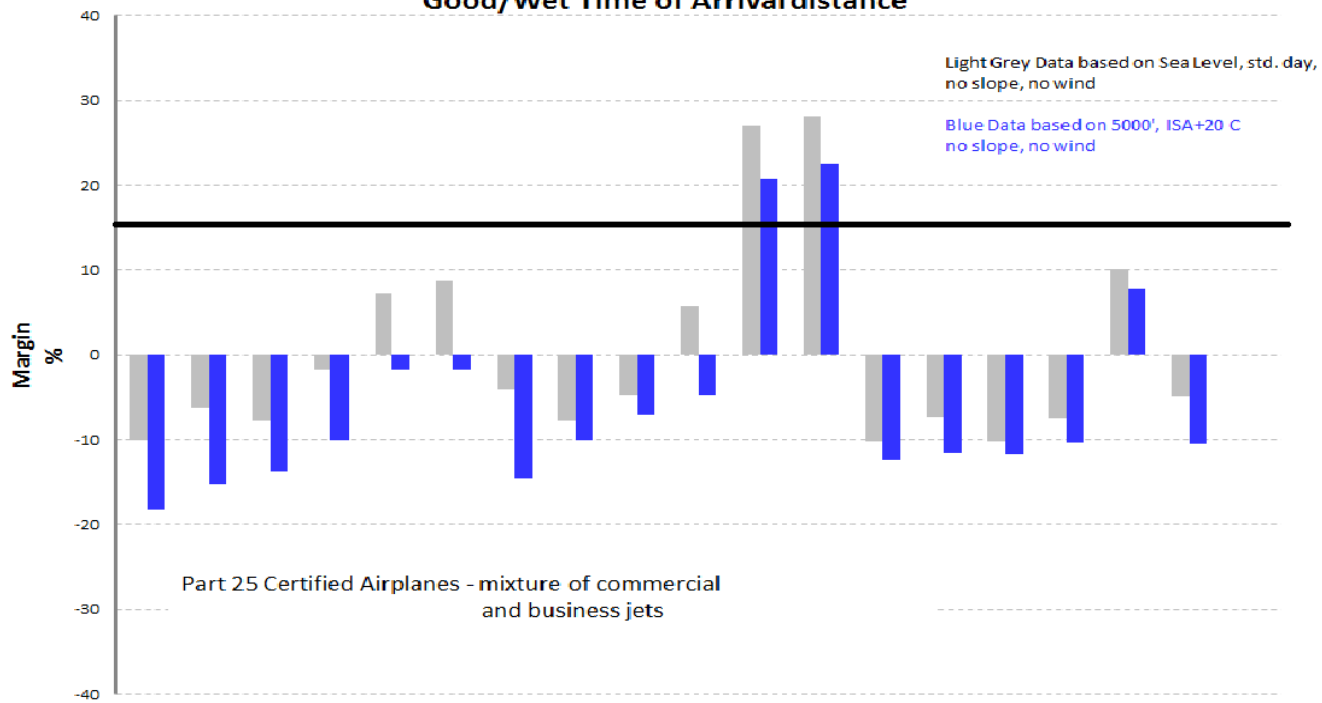
- **Impetus – Several wet runway overruns that have occurred demonstrated significant reduced wet runway wheel braking from what is expected.**



Current Regulatory Wet Margin (%) based on 1.92*CFR 25.125 dry to Good/Wet Time of Arrival distance



Current Regulatory Wet Margin (%) based on 1.44*CFR 25.125 dry to Good/Wet Time of Arrival distance



FTHWG recommendations to address Task 2

- **Define a new wet runway part 25 landing distance which accounts for the *physics* involved in stopping an airplane on a wet runway**
  - Based on realistic air distance (not currently done certified dry)
  - Based on reverse thrust credit
    - Current method results in significant margin reductions when:
      - 3 engine airplanes have 1 thrust reverser
      - 4 engine airplanes have 2 thrust reversers
      - Poor thrust reverser designs
      - No reverse thrust airplane designs
  - Full temperature accountability
  - Full engine failure accountability (at or after 50 feet)
  - 10% factor in part 25 all engine landing distance

Operational Rule Recommendations

- **Recommend operational factors for wet runway landing distance**
  - Should be the same for all operations (exception pure CFR 91)
  - Adequate to cover the reduced wet runway wheel braking observed in incidents.

- **Recommended all operating rules be based on a 15% increase on part 25 wet runway landing distance (25.126 proposed)**
  - Results in total wet runway landing distance margin at dispatch of 26.5% (1.10*1.15 = 1.265) on wet runway all engine landing distance
  - Results in total wet runway landing distance margin at dispatch of 15% if an engine fails at/after 50 feet
  - Results in landing distance necessary to account for reduced wet runway wheel braking observed in overruns (no additional margin added)

Operational Rule Recommendation 135EOD/91k

- **In recognition of reduced landing distances of 135EOD/91K Fractional Ownership**
  - Recommend the 15% factor above

Consensus

- **There is consensus that an improved wet runway rule is appropriate and needed to ensure adequate margin throughout the operating envelope. It is also agreed it is desirable to have a single method used for wet grooved/PFC or other new wet runway friction surface.**

Dissent – Embraer – size of total factor

- **Embraer dissented on the specific combination of part 25/part 121/135 operational factor total of 1.265**
  - This size of operational factor will result in some regional jets having a shorter SL, Std Day dispatch landing distance than current and some having a longer SL, Std Day dispatch landing distance.
  - This may lead to a re-certification of the airplane with the shorter “new” landing distance upsetting the competitive balance of the current operating aircraft.
- **Response**
  - Regulators desire larger total factor – 1.32 (1.1 part 25 *1.2 operating factor)
  - OEM’s and Operators desire smaller total factor – 1.21 (1.1 part 25 *1.1 operating factor)
  - This lower factor would not necessarily be acceptable to the regulators as the reduced wet runway wheel braking scenario would not be covered; the higher factor would not necessarily be acceptable to most manufacturers and operator as the increase in distance at SL, ISA conditions would be considered excessive.
  - Therefore, the 1.15 operational factor and total factor of 1.265 became an acceptable factor to most but it does not necessarily meet everyone’s needs.

Dissents – credit for reverse thrust

- **ALPA Dissent on reverse thrust credit:**
  - ALPA disagrees with including full thrust reverse credit in performance data. It is ALPA's experience application of reverse thrust may be inconsistent between pilots. Reverse thrust may not be used to its full efficiency due to variation in pilot experience or operational necessity (i.e. noise abatement).
  - Application of thrust reversers vary by aircraft operator and in some instances airline guidance is to minimize their usage due to wear and tear issues.
  - Further, thrust reversers are a deferrable item per the Master Minimum Equipment List, and during normal operations it is not unexpected to have an aircraft with one reverser inoperative. By allowing full credit for reversers, it is felt that the operational realities will not accurately mimic the flight test environment.
- **Response**
  - Current FAA dispatch requirements for wet runway are based on a dry runway calculation without consideration of reverse thrust (25.125) factored by operating requirement.
  - This results in the margin available on a wet or slippery runway by rule to be a function of the availability and usage of reverse thrust with the flight crew having no specific knowledge of what is required from them to obtain the stopping distance considered in the dispatch requirement on a wet or slippery runway.

Dissents – ALPA - credit for reverse thrust
Response continued

- Using the current data, the airplane with no thrust reversers or one thrust reverser or with an inoperative thrust reverser literally has less margin available than airplanes which have full thrust reverser availability.
- By including thrust reverser accountability and requiring data for all the combinations of thrust reverser usage (all reversers operative at recommended reverse thrust, idle reverse thrust, no reverse thrust) and taking into account the failure of an engine/reverser in the calculation of 25.126 the appropriate data will be available for consistent dispatch margins in all configurations for all airplanes.
- MMEL's will now have specific performance accountability for inoperative reverse thrust. This does add a variable to consider when dispatching
- Operators are free to assume idle reverse thrust or no reverse thrust if they feel it is appropriate because of requirements at any individual airports when computing there landing weight limits

Wet Grooved / PFC Improved Performance

- **Recommend codifying potential wet grooved/PFC improved performance in 25.126**
  - Discretion of the administrator as to airport/operational requirements
- **Considerations**
  - Manufacturer AFM coverage
  - Runway construction
  - Weather conditions
  - Runway condition
  - TOA assessment criteria
  - Operator conditions
  - Deviations from Criteria