

## Engine-Out Taxi

IFALPA acknowledges that one or two engines shut down can help to reduce noise, emissions and fuel use during taxi-in and taxi-out. Workload during engine-out taxi (EOT) before departure is considerably higher than during taxi-in, because of the engine start procedure. The influence on flight safety during a critical phase of flight must be carefully balanced against the operational benefit. IFALPA strongly opposes any mandatory engine-out taxi (EOT) procedure due to the multiple safety, efficiency and operational factors which vary for every aircraft, airport layout, weather conditions, surface conditions and traffic load.

IFALPA endorses the incorporation of an approved, standardized EOT procedure into the Operations Manual, as part of the taxiing procedures, provided the relevant crew training is performed. The EOT procedure must clearly identify and address any areas of potential confusion like applicability of the MEL, responsibilities and task allocation during start up and shutdown, and criteria for when it may or may not be applied.

An engine start procedure requires time and attention, which should not be detrimental to other taxiing duties, such as external visual scanning, systems monitoring and checklist accomplishment. Emphasis should be put on the fact that starting an engine significantly increases workload. System architecture such as automated start procedures and automated monitoring, detection, and engine abort capability influence the workload required for engine start. The availability of these systems determine the suitability of having a procedure allowing engine start during taxi, i.e. while moving.

The Operations Manual should clearly state that the EOT procedure is carried out at the Pilot-In-Command's discretion, after careful consideration of local and operational circumstances. Such circumstances include but are not restricted to:

- MEL items and operational/technical limitations;
- Local airport restrictions on such operations, for example taxiway/ramp surface gradients, minimum taxi speeds, maneuvering space, 180 degree-turns, break-away power and possibility of Foreign Object Damage (FOD) due to increased jet blast;
- Compliance with engine warm-up and cool down times for thermal stabilization as specified by the aircraft manufacturer;
- Taxiway/ramp surface status (for example slippery, wet) that may preclude the application of the procedure;
- Low visibility conditions;
- Operating procedures related to aircraft system monitoring and checklist accomplishment, which must be consistent with a late engine start (during taxi-out) and/or an early engine shut-down (during taxi-in);
- Complexity of aircraft engine start procedures;
- Aircraft design architecture related to abnormal engine starts and subsequent automatic engine shut downs;
- Ramp weight;
- Fuel imbalance;
- Limitations to the environmental benefit of the procedure due to the increased thrust requirements on the operative engine(s) for ground maneuvers.

If the Pilot-In-Command elects to carry out the EOT procedure in accordance with the above, the following factors should be taken into account:

### **General considerations on engine-out taxi**

- EOT is subject to pilot-in-command's discretion;
- Caution must be exercised when taxiing with one (for twin engine) or two engine(s) shut down, to compensate for the possible asymmetric force;
- Engine-out taxi should not be performed on slippery or contaminated taxiways;
- Slow and/or tight taxi turns in the direction of the operating engine may not be possible at high gross weight;
- Aircraft system operation need to be carefully considered to ensure critical systems used for taxi remain operative, e.g. nose wheel steering, brakes, fire protection system. System redundancy may be affected;
- The APU should be used during EOT;
- Should any mechanical problems occur during start-up of the other engine(s), a return to gate may be required for maintenance;
- There will be no fire detection from the ground staff when starting the engine(s) away from the ramp;
- Time required for engine start and thermal stabilization should not interfere with ATC operations and expectancy. Preferably expected taxi times are communicated to the crew;
- EOT shall not be used for fuel planning.

### **Procedures for engine start and/or shutdown during taxi**

- Any engine start and shutdown during taxi should be done in accordance with SOPs and normal system configuration;
- The moment of the second engine start should be briefed;
- Head down time required during engine start should be taken into account;
- Engine start should not be performed by the pilot having the controls during taxi;
- An engine should not be started when taxiing on an apron or a complex taxiway layout;
- An engine should not be started when crossing an active runway;
- An engine should not be started when taxiing in low visibility conditions;
- Consideration should be given to the expected departure flow with regards to the time needed for engine start and "after start" items;

*Note: Take-off configuration testing/warning functions might not include the engine operating state*

- A defined time is required before applying take-off thrust for thermal stabilization;
- A defined time is required before shutting down the engine(s) for thermal stabilization, depending, for example, on the use of full reverse thrust during landing.