



**U.S. Department  
of Transportation  
Federal Aviation  
Administration**

# SAFO

Safety Alert for Operators

SAFO 20004  
DATE: 3/20/20

Flight Standards Service  
Washington, DC

[http://www.faa.gov/other\\_visit/aviation\\_industry/airline\\_operators/airline\\_safety/safo](http://www.faa.gov/other_visit/aviation_industry/airline_operators/airline_safety/safo)

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*A SAFO contains important safety information and may include recommended action. SAFO content should be especially valuable to air carriers in meeting their statutory duty to provide service with the highest possible degree of safety in the public interest. Besides the specific action recommended in a SAFO, an alternative action may be as effective in addressing the safety issue named in the SAFO.*

**Subject:** Best Practices for Title 14 of the Code of Federal Regulations (14 CFR) Part 137 Agricultural Aircraft Operations.

**Purpose:** This SAFO serves to provide best practices to part 137 agricultural operators and pilots.

**Background:** On May 13, 2014, the National Transportation Safety Board (NTSB) issued, Special Investigation Report (SIR) on the Safety of Agricultural Aircraft Operations (NTSB/SIR-14/01 PB2014-105983), which chronicled recurring safety issues in the agricultural industry. The SIR recommended that the FAA take appropriate action in coordination with the National Agricultural Aviation Association (NAAA) and the National Agricultural Aviation Research & Education Foundation (NAAREF) to reduce associated hazards.

The FAA agrees with the NTSB's assessment and has considered information from NAAA and NAAREF on issues including, but not limited, to fatigue, risk assessment and risk management practices, pilot knowledge and skill subjects, and obstacle clearance and avoidance.

**Discussion:** The FAA strongly encourages all part 137 operators to be mindful of the safe operating practices discussed in Advisory Circular 137-1B, Certification Process for Agricultural Aircraft Operators, and consider the more detailed AC 120-100, Basics of Aviation Fatigue, to reduce and/or mitigate the effects of fatigue. This SAFO highlights several critical recommendations provided in the aforementioned ACs for Part 137 operators and pilots to consider.

As with the ACs relied upon, the contents of this document do not have the force and effect of law and are not meant to bind the public in any way. This document is intended only to provide clarity to the public regarding existing requirements under the law or agency policies.

**A. Fatigue Recognition and Prevention:** As described in FAA Advisory Circular 137-1B, adequate sleep is one of the most important factors in preventing fatigue. To ensure adequate sleep is obtained and fatigue managed, pilots should:

- Establish a bedtime routine, with 8 hours of uninterrupted sleep.

- Allow time for recovery sleep only sleep reverses sleepiness.
- Take breaks; get out of the aircraft and move around. If possible, take a 25-30 minute nap.
- Use of caffeine can improve alertness and performance.

In addition, operators should:

- Adopt a fatigue management policy, specifically addressing fatigue recognition and preventive practices.
- Review information at: [https://www.faa.gov/about/initiatives/maintenance\\_hf/fatigue/](https://www.faa.gov/about/initiatives/maintenance_hf/fatigue/)

**B. Pre-Flight Planning and Other Considerations:** As described in Advisory Circular 137-1B, other factors should be considered in addition to conducting a preflight on the aircraft.

- **Preflight and in-flight survey checklists.** Surveying the work area preflight and in-flight helps minimize the risk of incidents and accidents. Operators and pilots might wish to use preflight and in-flight survey checklists comprised of some or all the practices stated below:
  - Conduct a preflight survey of the working area, including the following:
    - Survey the working area by taking time to check company notes or pilots' personal comments that may be logged.
    - Study VFR charts and online maps to identify obstacles, towers, and structures as well as the lay of the land.
    - Before flying, speak to co-workers about obstacles in the proposed work area.
    - Check NOTAMs for proposed area of flight.
    - Consider checking the Daily Digital Obstacle File (DOF) provided by the FAA for obstructions, at: [www.faa.gov/air\\_traffic/flight\\_info/aeronav/digital\\_products/dof/](http://www.faa.gov/air_traffic/flight_info/aeronav/digital_products/dof/)
  - Conduct an inflight survey of the working area, including the following:
    - When reaching the work area, conduct an inflight survey from a safe altitude, well above the highest known obstacle.
    - Take into consideration the day's wind when planning the dispensing operation.
    - Plan aircraft turns in the safest efficient manner.
    - Be mindful, there could be unreported or unseen obstacles in a previously treated or flown area.
- **Fuel Management.** As described in AC 20-43C, Aircraft Fuel Control, fuel consumption should be thoroughly planned and managed. It is imperative to be aware of fuel status throughout the operation to not risk low fuel readings or incorrect calculations. Fuel should be filtered during refueling to help prevent fuel contamination.
- **Flight and Weather Information.** Check Notices to Airmen (NOTAM) and approved weather reports and forecasts daily.
  - Be mindful of crosswinds and the demonstrated crosswind capability of the aircraft utilized. Proper crosswind techniques when executing take-offs and landings as well as proper control inputs while taxiing reduces incident and accident risk.
  - Be knowledgeable about density altitude and how it degrades an aircraft's performance while executing take-offs and landings. Take the time to perform a "hot and heavy

load” calculation for the aircraft being used. This calculation should be performed using real data for the projected flights in the warm season. See link on Density Altitude - [https://www.faa.gov/gslac/ALC/libview\\_normal.aspx?id=56396](https://www.faa.gov/gslac/ALC/libview_normal.aspx?id=56396).

- **Weight and Balance.** Weight and balance configurations for varying product and fuel loads should be created and analyzed. Operators and pilots should know how operating at maximum gross weight affects aircraft performance and increases ground roll and maneuverability on take-off. When a product and fuel load configuration could affect an aircraft’s performance, a test flight with a partial load configuration would be prudent.
- **Flight Maneuvers During Application.** While dispensing, pilots should use flying techniques that will minimize off-target movements and maximize efficiency, without compromising safety. In addition, unsafe attitudes consume an aircraft’s energy. Be aware of aerodynamic stalls and avoid nose high attitudes and abrupt control inputs.

**C. Knowledge and Skill (K&S) Test.** As described in § 137.19(e) and Advisory Circular 137-1B at paragraphs 2.6.11 and 2.6.12, all pilots must satisfy the knowledge and skill requirements of part 137, and administered by the FAA, the operator, or the designated chief supervisor. Each operator, chief supervisor, or pilot must have their K&S test documented by a log book entry or separate document recording the passing of the test.

- The knowledge portion of the test can be given in an oral or written format.
- The pilot must, per § 91.103 and § 137.19(e)(1)(v) have adequate knowledge of operating limitations for the aircraft (contained in the aircraft flight manual (AFM) or the pilot’s operating handbook (POH)).
- Weight and Balance (W&B) information and knowledge should receive special emphasis. The applicant and the pilot must, per § 91.103 and § 137.19(e)(1)(v), also be knowledgeable of the aircraft’s performance capability under varying environmental conditions. Knowledge of performance capability includes items such as:
  - Stall speeds at maximum certificated gross weight, straight ahead, power off, and flaps up.
  - Best rate and best angle of climb speed.
  - Maneuvering speeds.
  - Density Altitude (DA) and its effect on performance (during take-offs and landings, and while maneuvering).
  - Performance capabilities and operating limitations of the aircraft to be used.
  - Takeoff distance required to clear a 50-foot obstacle at maximum certificated gross weight with zero wind (manned aircraft).
- Applicants who wish to dispense economic poisons must demonstrate a satisfactory knowledge and skill regarding the safe handling of economic poisons and the proper disposal of used containers for those poisons per 14 C.F.R. § 137.19(e)(1)(ii).
- Skill portion of test. Piloting skills and operational judgment should be evaluated in the following skill testing task areas:
  - Crewmember coordination and loading procedures. Have an agreed-upon plan and process on how this is accomplished safely.
  - Engine start, warm-up, and taxi procedures.

- Short-field and soft-field takeoffs (airplanes and gyroplanes only), directional control, liftoff, and climb. Take into consideration your aircraft's performance limitations, environmental conditions (temperature, wind, density altitude), and recommended procedures.
  - One soft-field takeoff and climb (airplanes and gyroplanes only). Be mindful of increased risk of ground roll and decreased acceleration when operating on non-paved surfaces.
  - Short-field takeoff and maximum performance climb. Be aware of obstacle clearance, wind gusts, and density altitude when planning and executing this maneuver.
  - Approaches to the working area. Satisfactorily conduct an aerial survey of the working area for known and possible unknown obstacles.
  - Flareouts. Flareouts should be consistently at same height and proper position over the field, taking account for any obstacles.
  - Swath Runs. Be consistent with altitudes and usage of Global Positioning System (GPS) swath guidance systems, maintain situational awareness, and do not fixate on the light bar marking your swath runs.
  - Pullups and turnarounds. These maneuvers are designed to get the aircraft turned around and set up for the next opposing swath pass; however, when done improperly they can constitute grave danger. Turns need to be accomplished in a smooth, coordinated manner. The pilot should have aerodynamic stall awareness and a plan to avoid putting the aircraft in such a position. A stall is a loss of lift and increase in drag that occurs when an aircraft is flown at an angle of attack (AOA) greater than the angle for maximum lift. A STALL CAN OCCUR AT ANY AIRSPEED, IN ANY ATTITUDE, AT ANY POWER SETTING. Factors such as weight, center of gravity, altitude, temperature, turbulence, and the presence of snow, ice, or frost on the wings will affect an aircraft's stall speed.
  - Rapid decelerations (rotorcraft only).
- Operators, chief supervisors, or both may choose to administer during each spraying season a K&S test review to all pilots. For example, the operator or chief supervisor or both may sit down with the pilots and have a table-top test review of the knowledge and skill portions of the test. Operators might consider adopting a pilot training program for your company that promotes safe operating guidelines.
  - Obstacle Clearance and Avoidance / Controlled Flight Into Terrain (CFIT). As noted in AC 61-134, General Aviation Controlled Flight into Terrain Awareness, CFIT normally occurs at a speed that results in fatal accidents. To avoid obstacles and reduce the risk of CFIT, Advisory Circular 137-1B, describes the following steps operators should take:
    - A pre-flight survey and in-flight survey of the work area are vitally important to avoiding obstacles. The pre-flight survey will allow you to become aware of any known potential obstacles and the in-flight survey will give you the best opportunity to catch any possible unknown obstacles, allowing a plan to work the area safely.
    - Avoid complacency, and maintain situational awareness. Ensure there is a safe distance between the aircraft and any obstacle. If possible, reduce the aircraft's speed for better reaction time in tight work areas (but always maintain a safe operating

speed). Of note, adequate sleep and fatigue management (see Paragraph A) is important for safe operations.

- When poles, towers or structures are present, be on the lookout for possible guy wires; even if you cannot see guy wires, in the interest of safety, ensure you maintain the same distance and clearance between the aircraft and the structure, as if they exist.
- The operations should comply with the minimum Visual Flight Rules (VFR) visibility requirements (14 C.F.R. § 91.155). Operators can chose to follow stricter visibility standards for added safety. The better you can see, the better you can avoid.

**Recommended Action:** Part 137 operators and pilots should familiarize themselves with the information contained in [FAA Advisory Circular 137-1B](#), Certification Process for Agricultural Aircraft Operators. It would also be beneficial for operators and pilots to familiarize themselves with [FAA Advisory Circular 120-100](#), Basics of Aviation Fatigue, and consider mitigation strategies that can be adapted for Part 137 operations.

**Contact:** Questions or comments regarding this SAFO should be directed to the General Aviation and Commercial Division at 202-267-1100.